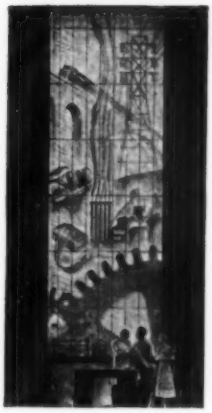
MEDICINE SURGERY

INDUSTRIAL HEALTH
OCCUPATIONAL DISEASES
TRAUMATIC, INDUSTRIAL



INDUSTRIAL HYGIENE
INDUSTRIAL MEDICINE
& RAILROAD SURGERY

Industrial Medicine | Volume 13 | APRIL, 1944 | Number 4 | Industrial Medicine

This Month

THE DIFFERENTIAL Heart Sound Meter.....*John H. Foulger, M.D.* 287
—A New Method of Detecting Early Physiological Changes Due to Toxic Chemicals, Etc.
(With *Paul E. Smith, Jr.*)
FRACTURE Fixation .....*Herman W. Wellmerling, M.D.* 294
—Analysis of External Techniques
ULTRA-VIOLET Radiation .....*Friedrich Ellinger, M.D.* 298
—Its Role in Industrial Medicine
VITAMIN K Therapy in Menorrhagia.....*Richard Gubner, M.D.* 301
—Preliminary Report of a Therapeutic Study
(With *Harry E. Ungerleider, M.D.*)
VENEREAL Diseases in Industry.....*Richard A. Koch, M.D.* 302
—Their Control as a Public Health Function
WAR CONFERENCE (St. Louis, May 8-14)..... 306
—Industrial Medicine, Surgery, Hygiene, Nursing, Dentistry
ARSINE, Stibine, and Hydrogen Sulfide.....*Carl A. Nau, M.D.* 308
—Accidental Industrial Poisoning by a Mixture
(With *William Anderson, M.D.*, and *R. E. Cone, M.D.*)
HUMAN Behaviour .....*H. Graham Ross, M.D.* 310
—And Its Relation to Industry
MEETINGS, CONFERENCES, COURSES:
Western Association of Industrial Physicians and Surgeons..... 314
General Motors Eighth Annual Medical Conference..... 314
Massachusetts Safety Conference..... 314
New York Post-Graduate Course in Industrial Medicine..... 315
Indiana's Second Industrial Health Conference..... 315
ORAL Vaccine Survey, Final Report..... 315
EDITORIAL: Current Definitions of Public Health..... 316
INDUSTRIAL Health and the Doctor..... 320
—Cincinnati Meeting, Ohio Series
HEALTH in Industry—(Grand Rapids Meeting)..... 326
INDUSTRIAL Health.....*Reported by C. O. Sappington, M.D., Dr.P.H.* 328
—Sixth Annual Congress
INDUSTRIAL HEALTH and DISEASE:
A Cooperative Health Program.....*J. J. Wittmer, M.D.* 346
Gynecological Examinations in Industry....*Forrest D. Gibson, M.D.* 349
American Optical Company's Health Department..... 350
INDUSTRIAL HYGIENE:
TEAMWORK .....*H. H. Schrenk* 353
DIFFERENCES in Points of View..... 353
INDUSTRIAL Hygiene Problems.....*Floyd A. Van Atta* 354
—In the Synthetic Rubber Industry
(with *Alfred M. Noyes*)
COMMENT on "Radium Painting".....*W. C. L. Hemeon* 360
—(*Morse and Kronenberg*, in "Industrial Medicine," December)
ARSINE, Stibine, and Hydrogen Sulfide.....*Carl U. Dernehl, M.D.* 361
—Accidental Generation in a Metal Refinery
(With *Frank M. Stead, M.S.*, and *Carl A. Nau, M.D.*)
NEWS of Local Sections..... 362
Personal ..... 8 Comment and Opinion.. 22
General .....12 Dr. Pilgrim 318
Current Articles of Quality..... 42
Ten Years Ago in Industrial Medicine..... 62

ANOTHER milestone in the organization of the science of preventive industrial medicine is represented in DR. FOULGER'S "Differential Heart Sound Meter" (p. 287). This follows the system of standardized measurements of blood pressure and statistical evaluation of the results which he described in INDUSTRIAL MEDICINE just a year ago. Developments such as these, with their almost immeasurable corrollaries, are giving prevention a meaning which even those who talked most about it as lately as only a few years since had hardly then begun to appreciate. In the hands of a growing number in whose experiences broad vision is the companion of great ability, it is well on its way to becoming the distinctive feature of industrial medical practice. And DR. FOULGER has a well established place in the vanguard of its leadership. . . . DR. WELLMERLING'S techniques in the "Fixation of Fractures" (p. 294) may not be better than everybody else's, but he is getting as good results as anybody could ask. . . . DR. ELLINGER'S study of "Ultra-Violet Radiation" (p. 298), in its almost "judicial" analysis of the benefits and risks involved in the industrial use of ultra-violet, well sustains his conclusion that such use, whether it is industrial, or bathing beach, should be "judicious". . . . DR. GUBNER'S "Vitamin K Therapy in Menorrhagia" (p. 301) is another of those records of experience which, from their accumulations, eventuate in the rules and guides of successful industrial practice. The only way they can acmulate for the general good of all who are interested is through their publication. In our ability to be the means of their immediate and effective publication we believe we are serving one of the principal functions of the official journal of the industrial medical field. . . . NOT everyone will concede to DR. KOCH ("Venereal Diseases in Industry," p. 302) his pre-summary conclusion that "it is the function of the public health department to find syphilis in industry." As "the" function,

—Continued on page 6.

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A.A.I.N., second annual meeting..... 306
A.A.I.P. & S., second "war conference"... 306
A.C.S. approval, 1101 establishments..... 12
Absenteeism, and the doctor (Tallman)... 324
women, causes (Sappington)..... 344
Accelerators, organic and inorganic..... 357
Accidental: poisoning, arsine, stibine, etc.. 308
toxic exposures 309
Acromioclavicular dislocations 295
American Association, Industrial Dentists. 306
American Industrial Hygiene Association. 306
Andre, Dr. Robert M., Ohio meeting..... 322
Arsine, stibine, hydrogen sulfide..... 308
accidental generation 361
Autonomic nervous system (Jarvis)..... 60
Aviation, medicine in (Grant)..... 336
Behaviour, human (Ross)..... 310
Book reviews 300
Buna rubbers 355
Butadiene 355
Business, recovery, postwar..... 28
Carbon: monoxide exposure, experiment.. 291
tetrachloride, Oregon study..... 32
Cardiovascular reactions, studies..... 291
Case finding, venereal diseases..... 302
Central States Society 326
Chest x-rays, findings..... 24
Chicago Section, I.H.A., meeting..... 362
Cincinnati meeting, Ohio medical series... 320
Cold: the common, as health prob. (I.H.F.) 12
vaccines (McGee et al., *J.A.M.A.*)..... 46
vaccines, survey report..... 315
Comm.: joint safety-health (Sperry Gyro) 16
OVR, advisory personnel 8
Communications: radium painting 360
Compensation, is not damages..... 38
Cost: of syphilis in industry..... 305
accident, not covered by compensation.. 26
DeMotte, Dr. R. J., new welding mask.... 14
Dental health program 352
Dermatitis, as injury (Babalian) 54
Differential heart sound meter (Foulger).. 287
Digitalis, feeding, experiment..... 290
Disability evaluation (Wrabetz)..... 342
Doctor ratio, "expert" opinion..... 22
Dorsett, J. Dewey, indust. health congr.... 342
Dysmenorrhea 302
Educational program, venereal disease.... 302
Efficiency: increase, ultra-violet..... 300
executive, maint. (Jarvis, *Med. World*).. 60
Electric eye, gas warning..... 18
Emotional problems of employees..... 313
Employment, mental aspects..... 50
Examinations: gynecological 349
pre-employment (Barlow, *J.A.M.A.*)... 48
routine, urine 23
Executive, maintaining efficiency..... 60
Eye problems (Holt, *J. Maine M.A.*)..... 54
Femoral shaft fractures..... 295
Findings: chest x-ray surveys..... 24
gynecological 349
Finger injuries (Toland et al., *Penn. M.J.*) 44
Florida Association of Industrial Surgeons 326
Forms, as visual record ("Ten Years Ago") 62
Fort Greene industrial health program.... 18
Fracture fixation, external techniques..... 294
Galbraith, Dr. D. J., indust. health congr... 342
Garfield, Dr. Sidney R., indust. health congr. 344
Gas warning, electric eye..... 18
Geier, Dr. Otto P., Ohio meeting..... 322
General Motors medical conference..... 314
Gradle, Dr. Harry S., indust. health congr. 338
Gynecological examinations (Gibson)..... 351
Handicapped veterans, International Harv. 20
Hazards: synthetic rubber..... 50
ultra-violet radiation 299
Health: conference, second Indiana..... 315
department, responsibility 303
individual, record (Burnell, *J.A.M.A.*).. 48
program, cooperative (Wittmer)..... 348
safety, committee, Sperry Gyroscope Co. 16
ultra-violet radiation, as factor..... 300
Heart: sound meter, detection, toxicities.. 287
sounds, diagram 288
Heat, transfer, research on..... 20
Heusinkveld, Dr. D. W., ind. health congr. 320
Hilleboe, Dr. Herman E., ind. health congr. 338
Holloway, J. W., indust. health congr..... 340
Hussey, Lt. Col., indust. health congr..... 338
Hydrogen sulfide, arsine, stibine..... 308
accidental generation 361
Hygiene, plant 350
Indiana, second health conference..... 315
Illnesses, non-occupational 46
Industrial: health, and the doctor..... 320
and labor (Watt)..... 334
Congress, sixth annual, abstracts..... 328
Council, report (Seeger)..... 328
dental program 352
institute, proposed (Norris)..... 336
nursing 311
objectives (Paullin) 330
physician, qualifications 311
place of industrial physician (Kehoe).. 322
postwar, panel on..... 332
program: cooperative (Wittmer)..... 348
Fort Greene 18
why a local (Geier)..... 322
Industrial hygiene: activities, state..... 24
Division of, plans (Townsend)..... 334
postwar 353
problems in synthetic rubber industry... 354
Industrial medicine: lecturers, Scranton.. 8
ophthalmology in 56
post-graduate course, New York..... 315
ultra-violet radiation in..... 297
Industrial physician: and administrator... 340
and mental hygiene..... 54
qualifications 311
Industry, conquest of tuberculosis (Hilleboe) 338
Injuries, care (Hosmer, *West Virginia M.J.*) 44
Injury: dermatitis as..... 54
second, funds (Dorsett)..... 342
Inorganic accelerators 357
Isobutyl polymers 356
Insurance, opportunities (Pilling)..... 334
Irritants, new industrial, skin..... 56
Jacob, W. P., industrial health congress.. 332
Johnstone, Dr. Rutherford T., discussion.. 322
industrial health congress..... 342
Kaiser: plan, description (Garfield)..... 334
new hospital 18
Kehoe, Dr. Robert A., Ohio meeting..... 322
Kronenberg and Morse (comnt. by Hemeon) 360
Labor, and industrial health (Watt)..... 334
medicine and industry (Long)..... 338
turnover, current figures..... 32
Laboratory services available 348
Lanza, Lt. Col. A. J., indust. health congr. 338
Laubscher, Nellie, R. N., hon. membership 326
Leggo, Dr. Christopher, Ohio meeting..... 322
Leverage, in fracture fixation..... 297
Long, Dr. C.-F., indust. health congr..... 338
Marihuana (Foulger, *Delaware S.M.J.*)... 60
Massachusetts, safety conference..... 314
McCord, Dr. Carey P., Ohio meeting..... 326
Medical: care, N.P.C. opinion poll..... 30
conference, General Motors..... 314
department, American Optical..... 350
job-analysis 56
knowledge pool, United Nations..... 34
service, Philadelphia pamphlet..... 12
service, statistics 346
Meetings: A.A.I.P. & S..... 306
American Association, Indust. Dentists 306
American Association, Industrial Nurses 306
American Indust. Hygiene Association.. 306
Central States Society 326
Florida Ass'n. of Industrial Surgeons... 326
Indiana, second industrial health.....34, 315
Massachusetts, safety 314
Michigan Industrial Hygiene Society.326, 362
Michigan, post-graduate 20
Nat'l Conference, Gov. Indust. Hygienists 306
New England Conference 326
New York, post-graduate..... 315
Western Ass'n., Indust. Phys. and Surgs. 314
Wisconsin, conferences 38
Menorrhagia, vitamin K therapy in..... 301
Mental: aspects (Markuson, *Mental Hyg.*) 50
attitude, patient's 44
examinations 50
hygiene (Brooks, *Mental Hyg.*)..... 54
Metal refinery, accidental toxicity..... 361
Metropolitan New York Section, I.H.A.... 362
Morse and Kronenberg (Comnt. by Hemeon) 360
Neoprene 354
New England Conference 326
Nitrous gases, exposure to, experiment... 289
Noise, effect on efficiency..... 26
Non-occupational illness (Kronenberg)... 46
Norris, Dr. Edgar H., indust. health congr. 336
Nursing, in industry..... 311
Occupational diseases: (Doyle, *Ky. M.J.*) 42
adequacy of coverage (Johnstone)..... 342
history (Townsend, *New Orleans M.&S.J.*) 42
problems (Johnstone) 322
Ohio series, Cincinnati meeting..... 320
Ophthalmology, value in industry..... 54
Opinion poll, N.P.C., medical care..... 30
Oral catarrhal vaccines, survey..... 315
Organic accelerators and antioxidants.... 357
Paullin, Dr. J. E., indust. health congr.... 330
Pelvic examinations 48
Penicillin, more powerful extracts..... 23
Personnel selection, importance..... 312
Pilling, Neville, indust. health congr..... 334
Pins, fixation with rods and..... 294
Plasticizers 358
Poisoning, arsine, stibine, hydrogen sulfide 308
Post-graduate: conference, Michigan..... 20
course in industrial medicine, New York 315
Postwar business recovery..... 28
Prevention, emphasis on ("Ten Years Ago") 62
Programs (see Meetings):
Congress (Sixth) on Industrial Health.. 328
second "War Conference," St. Louis.... 307
Psychiatry, in industry..... 313
Public health: and venereal disease control 301
current definitions 316
Radiation, ultra-violet 298
Radium painting, comment (Hemeon)..... 360
Records, sufficiency ("Ten Years Ago").. 62
Rehabilitation: casualty experience..... 16
veterans, begin now (Coates, *Factory*).. 46
wartime (Krusen, *Military Surg.*)..... 56
Research, on heat transfer..... 20
Rhode Island, cash benefit difficulties..... 12
cash sickness comp. (Farrell) 50
Rod fixation 294
Safety record, Westinghouse plant..... 30
Salt tablets, and vitamin C..... 12
San Francisco area, incidence of syphilis.. 303
Sappington, Dr. C. O., indust. health congr. 344
Scurvy, experimental development..... 290
Second-injury funds (Dorsett)..... 342
Security plan, I.B.M. employees..... 30
Seeger, Dr. Stanley J., report..... 328
Selective placement 60
Simmons, Brig. Gen. James S., congress.. 332
Skin irritants, new (Schwartz, *Penn. M.J.*) 56
Skull fractures, associated..... 294
Social security: "full money's worth"..... 22
"leaners" have votes..... 28
"S 1161" (Gehring, *J. Maine Med. A.*).. 46
Solvents 358
Specific problems, women (Hesseltine)... 48
State industrial hygiene activities..... 24
Statistics: gynecological findings..... 349
medical findings 346
Stibine, arsine, hydrogen sulfide..... 308
accidental generation 361
Survey, oral catarrhal vaccines..... 315
Synthetic rubber: hazards (Wilson)..... 50
problems in industry..... 354
Syphilis: cost of, in industry..... 304
incidence in industrial work 303
TNT, feeding, experiment..... 289
Tallman, Dr. Frank F., Ohio meeting.... 324
Thiokols 356
Tousant, Emma S., indust. health congr.... 340
Townsend, Dr. J. G., indust. health congr.. 334
Toxicities, early detection of (Foulger)... 287
Toxicity: arsine, stibine, hydrogen sulfide. 308
ration tokens, none 22
Tuberculosis in industry (Hilleboe)..... 338
Ultra-violet radiation in industry..... 298
Urine examinations, routine..... 23
Vaccines, oral catarrhal, survey..... 315
Venereal disease control in industry..... 302
Vinyl cyanide exposure, experiment..... 288
Vinyl polymers 357
Visual service (Gradle)..... 338
Vitamin: C, and salt tablets..... 12
K, therapy in menorrhagia..... 301
Vitamins, labor-management committee.. 26
Vonachen, Dr. H. A., OVR Advisory Com. 8
Vulcanizers 359
Watt, Robert J., indust. health congr..... 334
Welding fumes: (Jones, Lockhart)..... 42
new mask, Dr. R. J. DeMotte..... 14
Western Ass'n of Indust. Phys. and Surgs. 314
Wishard, Dr. Fred B., indust. health congr. 344
Women: absenteeism, causes (Sappington) 345
coordinator (McManus, *Safety Engr.*).. 42
health maintenance program..... 48
health program for (Wishard)..... 345
proper placement 48
protection for, in industry (Anderson).. 344
specific problems in employment..... 48
symposium on, in industry..... 344
working conditions for..... 46
Workmen's compensation (Holloway).... 340
Wound, treatment technic (Toland)..... 44
Wrabetz, Dr. Voyta, indust. health congr.. 342
X-ray surveys, chest..... 24

WANTED: Copies of INDUSTRIAL MEDICINE for March, 1944. See adv. on page 22.

how to fight fatigue and heat-prostration

SUMMER's sultry sun plus the man-made heat of coke-oven or blast-furnace cause workers to lose vital body-salt through perspiration, often as much as 300 grains per man in a single day. This loss causes muscle-cramps, excessive fatigue, heat-prostration, and gastro-intestinal upsets. Sharp & Dohme's 'Thermotabs' Tablets Sodium Chloride and Dextrose are designed for relieving hot-weather fatigue by replacement therapy.

'Thermotabs' Tablets have long been used in steel mills and other industries where high temperatures from within and without affect workers adversely. Supplied in bottles of 100 and 1,000 tablets as well as bulk. Each tablet contains Sodium Chloride 7 grains and Dextrose U. S. P. 3 grains.

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Sharp & Dohme, Philadelphia 1, Pa.

'THERMOTABS' *Tablets Sodium Chloride and Dextrose, S & D*

—Continued from page 3.

this has implications — such as are touched upon in the editorial (p. 316). . . . THE "War Conference" this year (p. 306) represents, as it were, complete coverage. The five participating organizations comprise the physicians and surgeons, the hygienists, the nurses and the dentists whose professional arenas are industrial. This alone insures the maximum of useful information to those who will go there to learn, as well as the season's most important opportunity of usefulness to those who will be there to instruct. All of which promises, as the program says, "A conference to be remembered. . . . DR. NAU and his associates present two phases of the "Arsine, Stibine, and Hydrogen Sulfide" episode; the first (p. 308) analyzing the accidental poisoning; the second (p. 361) explaining the accidental origin of the poison. The concurrent appearance emphasizes the fact that, as the authors conclude, "Toxic and hazardous exposures may occur accidentally and go undiagnosed if the nature of the operations and potential reactions is not understood." This is another, and very effective, expression of the necessity for complete familiarity on the part of the industrial physician with all the processes of the plant where the employees are in his charge. Examples of this kind are vastly more persuasive than even the most forcibly phrased pronouncements. . . . DR. ROSS' "Human Behaviour" (p. 310) is an excellent cross-section of what *Canad. M.A.J.* refers to editorially as "the modern plan of understanding and appraising the capacity and circumstances of the worker." This is also pretty well known as "selective placement" . . . . APRIL seems to be ushering in a season of meetings. Some of those of major significance are noted on pages 314 and 315, following the outline of the attractive program DR. RUTHERFORD JOHNSTONE is preparing for the fourth annual meeting of the WESTERN ASSOCIATION OF INDUSTRIAL PHYSICIANS AND SURGEONS in Los Angeles, Saturday, May 6. It is to be regretted that this meeting—scheduled, as usual, for the day preceding the opening session of the California State Medical Association —will occur so close to the second "War Conference" in St. Louis which begins on Tuesday, May 9. But inasmuch as the AMERICAN ASSOCIATION OF INDUSTRIAL PHYSICIANS AND SURGEONS does not convene until Thursday, May 11, there is still time to get from one to the other. No doubt a good many members of the Western component would like to attend both meetings. May they all find it possible to do so! . . . WE REMARKED last month on the increasing number of good articles on industrial medical subjects lately appearing. To emphasize this, and, more important, to aid in easier finding, we give credit, by author, journal, and page, to as many as we can make room for ("Current Articles of Quality," p.42). Instead of synopsis or abstract, a significant paragraph in the author's own words is offered as a guide to the "must read" list of the near future. . . . INTERESTING to note, in "Knights Errant," on the President's Page of *Wisconsin Med. J.* for March, that DR. R. M. KURTEN—calling for "a return to the basic concept of medical men practicing medicine and insurance people selling and processing insurance"—closes with the quotation "God give us Men!" It is a good quotation, and a timely one. We used it, in our February issue, at the end of an editorial with the same title. It was written by Josiah G. Holland (1819-1881). We like, particularly, the lines: "Tall men, sun-crowned who live above the fog in public duty and in private thinking." And that other one: "Men who have honor; men who will not lie!"

A.S.R. Corp., Surgeon's Division 15
Surgeon's Blades and Handles
Alkalol Company, The 346
Alkalol
Aloe, A. S., Company 38
Blood Plasma Equipment
American Optical Company 329
AO Ful-Vue Acetate Goggle
Anacin Company, The 35
Anacin
Anglo-French Laboratories, Inc. 348
Hepvise for Hypertension
Baum, W. A., Co., Inc. 18
The Baumanometer
Becton, Dickinson & Co. 62
B-D Syringes
Bisodol Company, The 325
Bisodol Powder, Mints
Breck, John H., Inc. 55
Breck pH7 Protective Cream
Breon, George A., & Company 20
Sulthigel
Bristol-Myers Company 323
Trushay
Burdick Corporation, The 63
Burdick Solarium Shower
Cambridge Instrument Co., Inc. 56
All-Electric Electrocardiograph
Camp, S. H. & Company 7
National Posture Week
Carbisulphoil Company 29
Foille—for Burns
Chesebrough Manufacturing Company 17
Vaseline Petroleum Jelly
Ciba Pharmaceutical Products, Inc. ..... 4th Cover
Coramine
Cilkloid Company, The 42
Cilkloid Dressing
Cole Chemical Company 12
Caloe Ointment
Crookes Laboratories, Inc. 345
Enzo-Cal Protective Cream
Denver Chemical Mfg. Company, The 26
Acetone Test
Denver Chemical Mfg. Company, The 32
Antiphlogistine
Desitin Chemical Company 34
Desitin Ointment
Dixie Cup Company 23
Dixie Cups
Dolge, The C. B., Company 332
Handeez; Prevento; Dolcogards
Dome Chemicals, Inc. 22
Daxalan
Drug Products Co., Inc., The 340
Sulfarea; Sclorea
DuPont Company 61
Du-Pont Pro-Tek
Edroy Products Co. 16
Magni-Focuser Binocular Eye Loop
Effervescent Products, Inc. 50
Clinitest
General Cellulose Co., Inc., The 60
Cellulose Wipes
Health Cigar Co., Inc. 14
Sano Cigarettes
Holland-Rantos Company, Inc. 339
The Koromex Set Complete
Hollings-Smith Co. 333
Carbex Bell
Hynson, Westcott & Dunning, Inc. 336
Mercurochrome
Ilie Electric Corporation 320
Portable Unit for Hydromassage
Industrial Medicine Book Company 42
"The Mind of the Injured Man"
Iodine Educational Bureau, Inc. 344
Iodine
Irwin, Neisler & Company 47
Osmopak
Johnson & Johnson 1
Ray-Tec Sponges and Lap Packs
Johnson & Johnson 317
Red Cross Plaster
Kny-Scheerer Corporation 54
Surgical Instruments
Leeming, Thos. & Co. 24
Baume Bengué
Leeming, Thos., & Co., Inc. 39
Magmasil
Lily-Tulip 28
Paper Cups and Containers
McNeil Laboratories, Inc. ..... 2nd Cover
Aspirocal Comp.
Medicone Company 43
Rectal Medicone
Merck & Co., Inc. 13
Pyridium
Merrell, The Wm. S., Company 45
Ceepryn
Milburn Company, The 51
Ply Liquid; Ply Cream
Mine Safety Appliances Company 327
Fend—Creams and Lotions
Mine Safety Appliances Company 335
H-H Inhalator
Morton Salt Company 324
Heat-Fag Salt Tablets
Murine Company, The 46
Murine
New York Medical Exchange 340
Personnel Placement
Numotizine, Inc. 48
Nuzine Ointment
Nutrition Research Laboratories 40, 41
Bezon
Nutrition Research Laboratories 58, 59
Ertron
Occy-Crystine Laboratory 28
Occy-Crystine
Parke, Davis & Company 9
Glaseptic Ampoules
Parker, White & Heyl, Inc. 31
Bard-Parker Germicide
Patch, The E. L., Company 352
Gadoment
Patterson Screen Division (Du Pont) 21
Patterson Screens
Pelton & Crane Company, The 30
Pelton E & O Surgical Light
Picker X-Ray Corporation 2
Diagnostic X-Ray Apparatus
Potter Drug & Chemical Corp 44
Cuticura Soap; Cuticura Ointment
Progressive Laboratory Specialties Company 332
Derma-Tectors
Reed & Carnrick 33
Tonicine A; Tonicine B
Reynolds, R. J., Tobacco Company 341
Camel Cigarettes
Schuylkill Chemical Co. 352
Sulfallantoin
Schmid, Julius, Inc. 321
Ramsea Diaphragm Introducer
Searle, G. D., & Co. 52, 53
Metamucil
Seamless Rubber Company, The 19
SR Surgical Dressings
Serutan, Professional Service Div. ..... 3rd Cover
Serutan
Sharp & Dohme 319
'Riona' Capsules
Sharp & Dohme 5
'Thermotabs'
Shield Laboratories 337
Riasol
Squibb, E. R., & Sons 64
Special Vitamin Formula Capsules
Stearns, Frederick, & Company 331
Neo-Synephrine Hydrochloride
Stepan Chemical Company, The 11
pH6 Skin Cleanser
Tailby-Nason Company 343
Supertah Ointment
Upjohn 25
Malcogel
Wallace & Tiernan Products, Inc. 57
Azochloramid Preparations
West Disinfecting Company 347
Protective Creams
White Laboratories, Inc. 36, 37
White's Sulfathiazole Gum
White Laboratories, Inc. 36, 37
Vitamin A and D Ointment
Whittaker Laboratories, Inc. 348
Cooper Creme
Willson Products, Incorporated 328
Approved Universal Gas Mask
Winthrop Chemical Company, Inc. 27
Pluravit
Wyeth, The Bovinine Company, Division 49
Vitules

One of several inspiring posters in color, which will be used as a theme for many patriotic displays during National Posture Week.

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CAMP

6TH ANNUAL NATIONAL POSTURE WEEK

May 1st to May 6th

The annual observance of National Posture Week has done much to focus nation-wide attention on the significance of good posture and has encouraged many suffering from poor body mechanics to seek professional counsel.

The importance of good posture to good health and physical fitness will again be emphasized through the distribution of ethical and authoritative literature to schools, colleges, industrial and professional public health educational groups.

Large numbers of physicians, educators and groups in the field of public health have expressed their appreciation for this work.

It is our hope that our current campaign and efforts will continue to merit this approval and contribute further to America's victory program for physical fitness and for the arduous post-war readjustment period which is anticipated.

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THE LECTURERS, in the 10-lesson course reviewing industrial medicine and hygiene, given at Scranton, Pennsylvania, under the sponsorship of the Lackawanna County Medical Society during February, included DR. WILLIAM M. GAFAFER, senior statistician, U. S. Public Health Service; DR. HUGH P. BRINTON, statistician, U. S. Public Health Service; DR. GLENN S. EVERTS, medical director, F. G. Vogt & Sons; DR. JOSEPH SHILEN, chief of the Division of Industrial Hygiene, Pennsylvania Department of Health; WALTER MATTHEWS, chairman, Industrial Safety Bureau, Philadelphia Chamber of Commerce; DR. JOHN FOULGER, director, Haskell Laboratory, E. I. du Pont de Nemours Company; DR. LYNN GRACE, Pennsylvania Department of Labor; DR. LYDIA GIBERSON, Medical Division, Metropolitan Life Insurance Company; MISS ANNA FILLMORE, industrial nursing consultant; DR. LEONARD GREENBERG, Industrial Health Laboratories, State Department of Labor, New York; and DR. LOUIS SCHWARTZ, medical director, Dermatoses Section, U. S. Public Health Service.

DR. HAROLD A. VONACHEN, medical director, Caterpillar Tractor Company, Peoria, Illinois, is a member of the recently appointed Professional Advisory Committee of the Office of Vocational Rehabilitation, which held its first meeting in Washington, March 3. The purpose of the committee is to provide professional guidance in mapping the new State-Federal program for medical and surgical care under the Borden LaFollette Act. MICHAEL J. SHORTLEY, OVR director, estimates that one and a half million persons may be eligible for rehabilitation under the program authorized by this Act. The Committee is making recommendations for the advice of state rehabilitation agencies in the following areas of operation: the scope of physical restoration services; professional standards for physicians, hospitals and other facilities providing services under state programs; auxiliary services in the fields of

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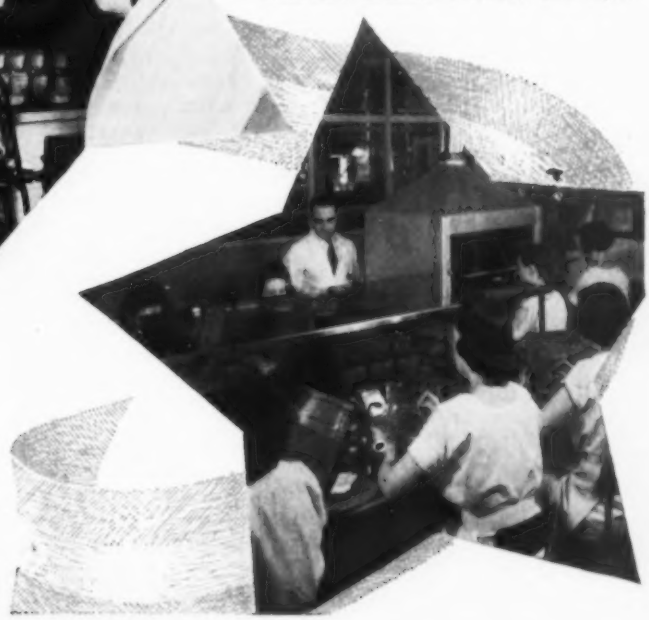

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DR. FRANK T. BARKER, 48, of Tampa, Florida, Secretary-Treasurer of the FLORIDA ASSOCIATION OF INDUSTRIAL SURGEONS, died suddenly while at work in his office, January 5, 1944.

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GENERAL

INDUSTRIAL Hygiene Foundation, Pittsburgh, has reissued, in pamphlet form, the text on "The Common Cold as an Industrial Health Problem," by SIMON S. LEOPOLD, M.D., reprinted from the proceedings of its Seventh Annual Meeting, in 1942.

THIRTY MEN working in an industrial plant where temperatures were well over 100° F, with high atmospheric humidity, were given vitamin C in addition to salt tablets. *(Science Supplement, 95:12).* Though heat disorders had occurred among workers in this factory previously, none developed in the workers treated with ascorbic acid.

—*What's New*, Abbott Laboratories, February, 1944.

WHY Industrial Medical Service Should Be Adopted" is the title of a circular sent by the Health Committee of the Chamber of Commerce and Board of Trade of Philadelphia, to manufacturers in the city and vicinity. First, the need of such service is demonstrated by the accident frequency of the Five-County Philadelphia area. The information about medical service is given in the form of questions and answers, for instance, what medical service is available to a small plant at reasonable cost? Will a medical service decrease the lost time due to accidents? The scope and cost of a medical service are included, and recipients are asked to write for any other information desired.

—*Industrial Hygiene Digest*, February.

A.C.S. Approval

UP TO December 31, 1943, a total of 1,849 different industrial establishments representing over 5,000,000 employees had been surveyed by the American College of Surgeons from the standpoint of medical service. Of these, 1,101, or 59%, were fully or provisionally approved on that date.

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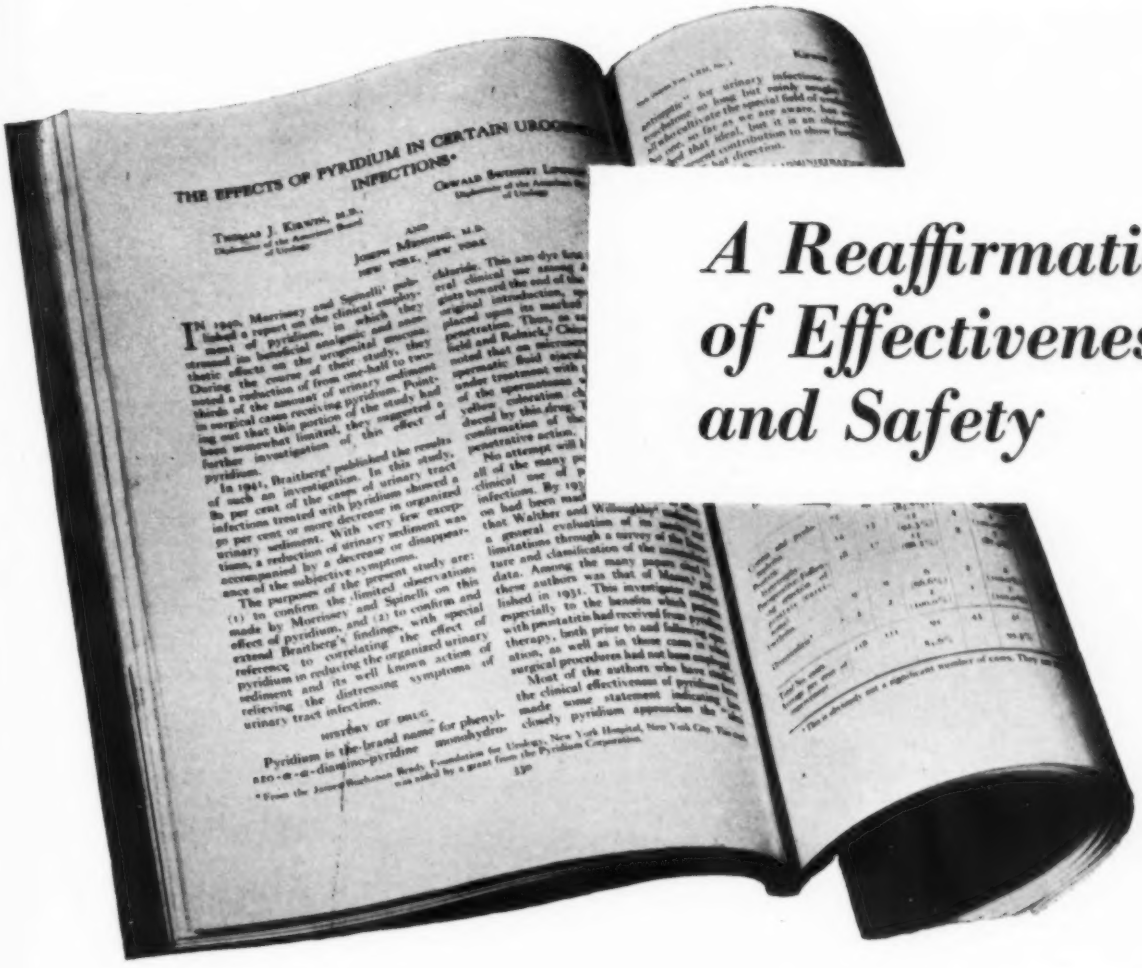

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THE recent careful study conducted by Kirwin, Lowsley, and Menning, of the James Buchanan Brady Foundation for Urology, New York Hospital, and published in the December 1943 issue of *The American Journal of Surgery*, reaffirms the many previously published reports emphasizing the clinical effectiveness and complete safety of Pyridium in the symptomatic treatment of common urogenital infections.

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—*Modern Medicine.*

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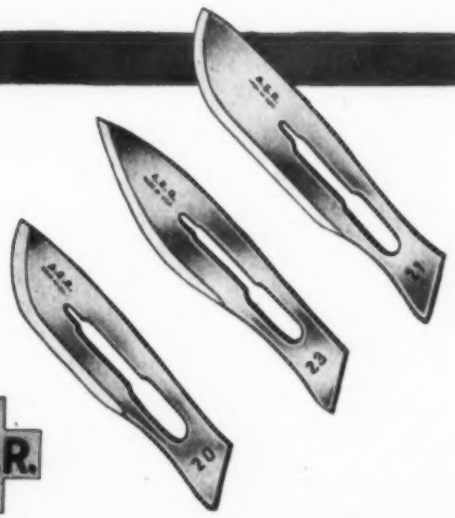

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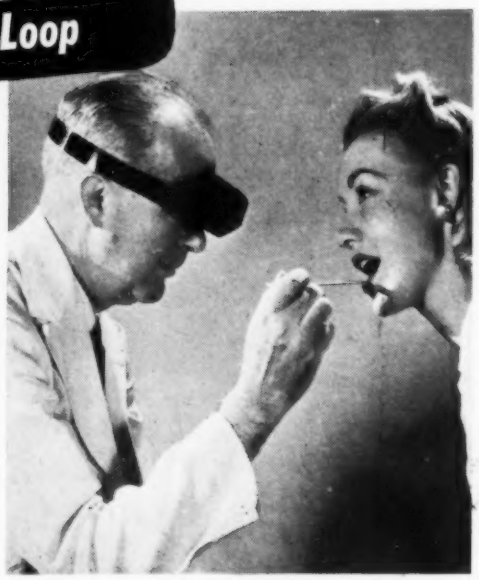

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Rehabilitation Experience

THE result of the broadest program of industrial and public safety in 1943 that the United States has ever seen shows an estimated reduction of 16% in the industrial rate per man-hour and a reduction in all accidents of 7%, said Charles E. Hodges, president, American Mutual Liability, at a meeting of the company's New York advisory board at the Union League Club, New York City, recently. Mr. Hodges touched on re-employment of physically substandard or injury-impaired personnel because of the release of several hundreds of thousands of men for reasons of disability. He said that the experience of mutual casualty companies for the past three decades in rehabilitating injured industrial workers for their former jobs will furnish an excellent background for dealing with a much larger volume of cases of this kind.

—*Eastern Underwriter*, March 3.

Joint Safety Health Committee

MANAGEMENT and employees of the Sperry Gyroscope Company, recognizing the tremendous importance of safety and health education, have established a Joint Safety and Health Planning Committee. Represented are the 20,000 production workers and guards through UE Local 450 (CIO), the electricians, through the IBEW (AFL), the foundry workers through the FWA (AFL), the moulders through the MA (AFL), the salaried workers, and the Sperry management. The first task undertaken was the establishment of a structural apparatus, throughout the entire company, with shop stewards and management functionaries in each department, whose job it will be to carry out the plans and directives of the top committee. When the set-up is completed, the committee expects a smooth-working organization, geared to handle in the most efficient manner any large-scale undertaking in their field, many of which are now being planned. The committee recognizes that the success of anything they undertake will, in large measure, depend upon the interest that can be aroused among the workers who are to benefit.

—GEORGE ROONEY, in *Here's to Your Health*, March 1, published by Fort Greene Industrial Health Committee, Brooklyn, New York.

Physical Examination Clause

A COLLECTIVE-bargaining conference involving a large group of airline mechanics on the Pacific Coast produced a clause on physical examinations that has been incorporated into a union agreement. The question of physical examinations for employees in unions has long been a controversial one at the conference table. An increasing number of union agreements contain clauses covering this question. This particular clause stipulates: (a) The company may, at least once a year, require any employee to pass a physical examination, made at the company's expense, by a medical examiner employed for that purpose by the company. The medical examiner shall supply such information as the company may require and the company shall have the right to rely and act upon the opinion of such examiner. (b) The company will use its best efforts to ameliorate such working conditions as are shown by these physical examinations directly to have caused physical disability. (c) Employees who have given long and faithful service

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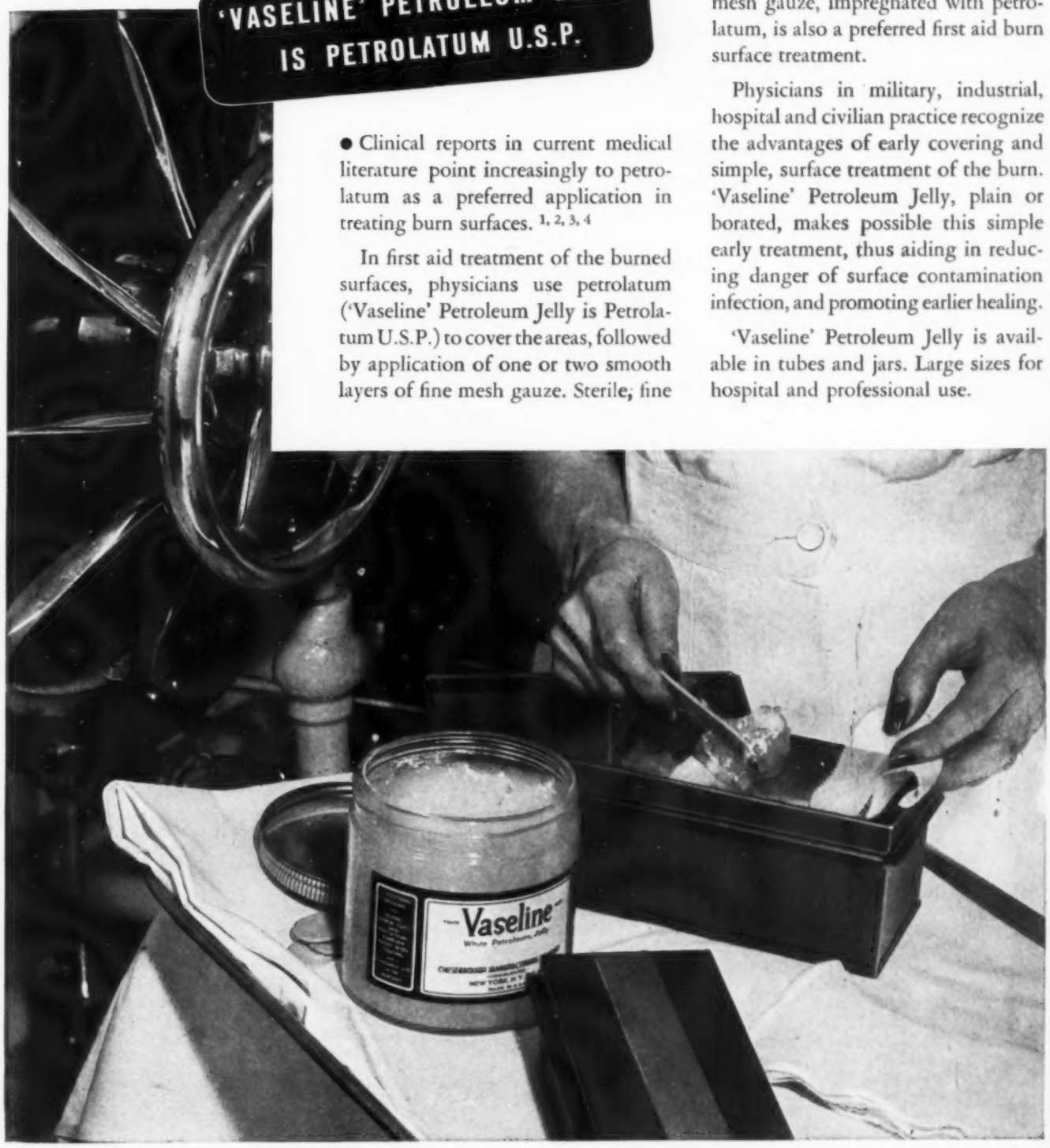

● Clinical reports in current medical literature point increasingly to petrolatum as a preferred application in treating burn surfaces. [1, 2, 3, 4]

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1. J. A. M. A. 122:909 (July) 1943.
2. Ann. of Surg. 117:885 (June) 1943.
3. Brit. M. J. 2:223 (Aug. 21) 1943.
4. Surg., Gynec. and Obst. 74:914-924 (May) 1942.

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and who have been unable to follow their occupations to advantage shall be given preference of such light work in their line as they are able to handle. (d) No prospective employee shall be accepted for permanent employment, and no employee or former employee shall be accepted for re-employment, without passing a physical examination of similar purpose, similarly made, at the company's expense, when requested by the company.

—*Industrial Hygiene Digest*, February, quoting *Management Record*, January, 1944.

New Kaiser Hospital

IN WASHINGTON, on December 28, Henry J. Kaiser stated he was ready to start work on a new hospital in Alameda County, and had authority for it from every Federal agency except the Production Urgency Committee of the War Production Board for the San Francisco Bay Area. "The Federal Works Administration has agreed to build the hospital and lease it to us for 20 years, and the President has approved the project," said Kaiser. "But four weeks have passed and we haven't been able to start on it because the Production Urgency Committee doesn't think it's urgent. And at the same time the newspapers are carrying stories about women dying because they can't get hospital care." Mr. Kaiser disclosed that an attempt had been made to get the Urgency Committee to change its stand. Meeting with one of his aides, the Coordinating Committee for Medical Care for the State of California, composed of representatives of the Department of Public Health, hospitals and doctors, unanimously approved the project following a report from Major Smith of the Office of Civilian Defense as to the dire need for the new hospital. Mr. Kaiser said he had been informed that opposition to the project stemmed from hospitals around the Bay, which fear the post-war effect of new structures. Turning to the hospital problem, Mr. Kaiser said one of his hospitals in Richmond has treated 1,500,000 cases and is now providing approximately 125,000 treatments a month for the 90,000 workers he employs there.

—*California & Western Med.*, February.

Gas Warning by Electric Eye

AN ULTRA-VIOLET photometer, developed by du Pont, warns against dangerous concentrations of injurious gases. Its operation is based on light absorption by gases. When a particular gas passes through the apparatus and the light (including ultra-violet) is passed through a prism dark bands appear in a definite position, and an electric eye in one of these bands gives the warning signal. Carbon disulfide can be detected to the extent of one part per million. The photometer is more rapid and simple in operation than other types of gas analyzers, and permits accurate second-by-second observation of the vapor level in each step of an operation. The Mine Safety Appliance Company is planning to manufacture these instruments.

—*Industrial Hygiene Digest*, February.

Fort Greene Industrial Health

NEARLY 500 industrialists, labor leaders, public health officials, and representatives of various civic organizations attended a dinner in Brooklyn, February 28, to inaugurate an intensive health education program for industrial workers in the Fort Greene District of Brooklyn. This project, which is to be a demonstration for a period of one year, is headed by REGINALD E. GILLMOR, President, Sperry Gyroscope Company, and LOUIS HOLLANDER, Manager of the New York Joint Board, Amalgamated Clothing Workers of America, co-chairmen. The Fort Greene Industrial Health Committee is carrying on its program as a cooperative undertaking of management, employee groups, the New York City Health Department, the medical profession, and a number of voluntary health agencies. Approximately 150,000 men and women employed in the area will be reached by the drive to reduce preventable accidents, illness, and resultant absenteeism. It is sponsored by Neighborhood Health Development, Inc., in cooperation with New York City Health Department, American Social Hygiene Association, and Brooklyn Tuberculosis and Health Association. In addition to MR. GILLMOR and MR. HOLLANDER, other officers are DR. CHARLES F. MCCARTY, Executive Secretary, Kings County Medical Society, Secretary, and MR. J. V. GILLOON, JR., Industrial Administrator, A. Schrader's Son, Treasurer.

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Methyl cellulose in drying forms a pliable film. It holds an effective concentration of sulfathiazole at the lesion over relatively long periods. Crystals of the drug do not form.

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Headquarters are in the Fort Greene Health Center of the New York City Health Department, 295 Flatbush Avenue Extension, Brooklyn, where MRS. CARMEN HENRY is Executive Secretary.

Harvester Veterans

ONE of industry's most comprehensive programs for the absorption of former employees returning from service was announced yesterday by the International Harvester Company. Fowler McCormick, president, said facilities for the employment, placement, and training of employees were being established at 21 Harvester plants and raw materials operations, and at 187 sales branches throughout the country. "Our objective is to provide a job for every qualified Harvester veteran and to try to help every Harvester veteran qualify for a job." Principal goals of the program include placing each returning employee in his former position, or one of corresponding seniority and pay; training for new positions those who have suffered physical handicaps as the result of their service, and utilizing the higher skills of those qualified for more expert jobs through their military training. "Of the more than 15,000 Harvester men and women in various branches of military service, many are beginning to return for employment following their honorary discharge from service," McCormick said. Handicapped employees will be given less arduous duties, and mechanical changes will be made when possible and necessary for those more seriously handicapped. Those whose former skills and aptitudes have become "rusty" while in service will be trained. The veteran will be paid during training, at a rate subject to review at least once a month.

—*Chicago Tribune*, March 9.

Michigan Conference

THE Michigan State Medical Society held its annual post-graduate industrial medical and surgical conference at the Horace A. Rackham Educational Memorial, Detroit, April 6. Among the subjects and speakers were:

"Newer Trends in Industrial Sanitation"—MOHE E. SOLWORTH, Sanitation Consultant, Louisville, Kentucky.

"The Psychiatric Approach to Current Mental Health Problems in Industry"—DR. LEONARD E. HIMLER, Ann Arbor, Michigan.

"How to Control Epidemics of Occupational Dermatitis, with Special Emphasis on the Epidermophytoses" — SAMUEL PECK, senior surgeon, U. S. Public Health Service Reserve.

"Criteria for Employability of Individuals with Lung Pathology" — DR. CHARLES-FRANCIS LONG, Philadelphia.

"Inplant Rehabilitation Programs for Disabled Veterans"—DR. MARION W. JOCZ, Detroit.

"Eye Pathology Due to Exposure to Organic Solvents"—DR. MELVIN H. PIKE, Midland, Michigan.

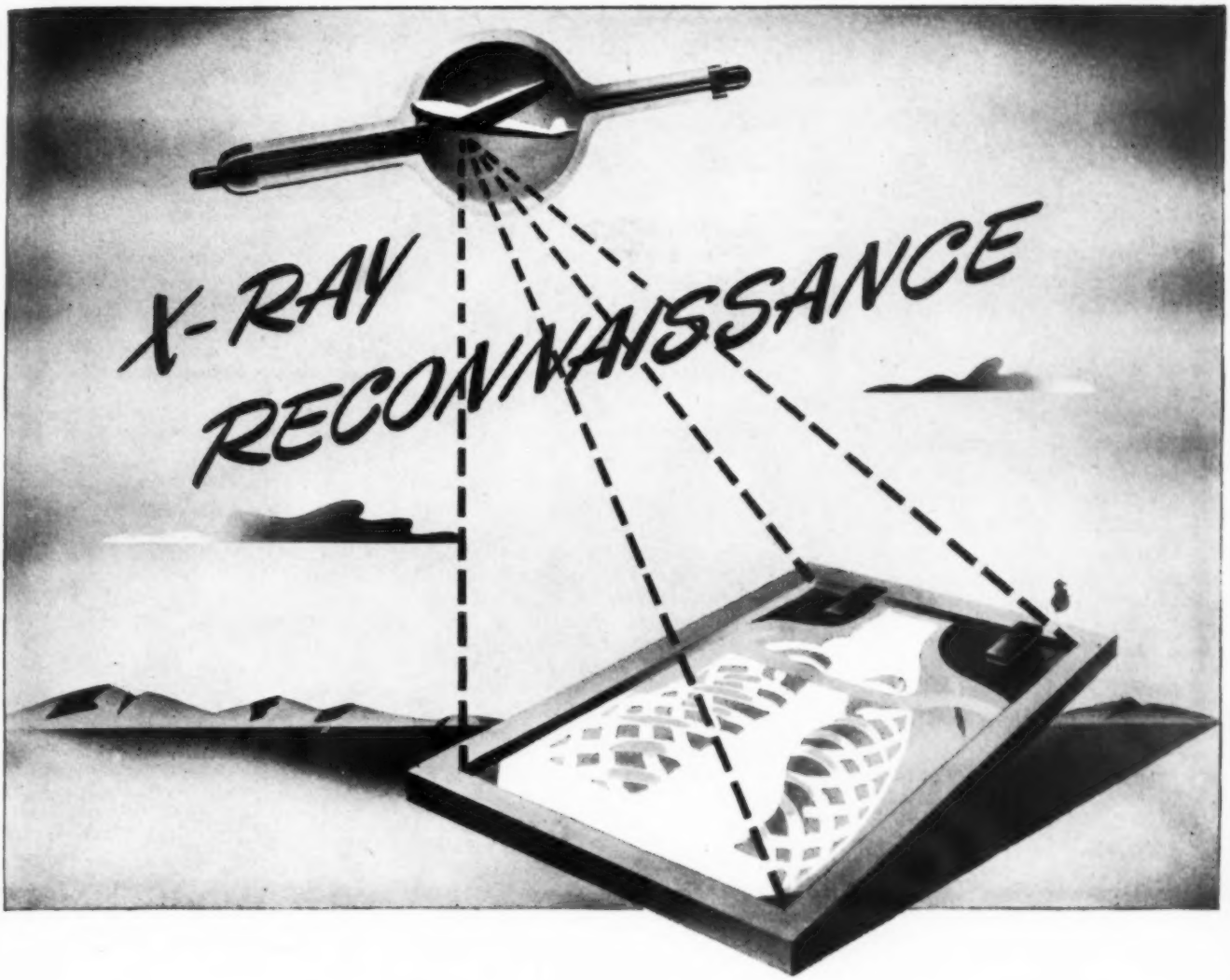
"A Comparison of Various Salt Solutions in the Treatment of Burns"—DR. CARL A. MOYER, Ann Arbor, Michigan.

"Clinical Uses of Penicillin"—DR. JOHN W. HIRSHFELD, Detroit.

DR. KENNETH E. MARKUSON, Lansing, was chairman of the meeting. A luncheon session was addressed by MAJOR FRANK H. MAYFIELD, M.C., A.U.S., on peripheral nerve injuries. The meeting was sponsored by the committee on industrial health of the state medical society and the MICHIGAN ASSOCIATION OF INDUSTRIAL PHYSICIANS AND SURGEONS in cooperation with the department of post-graduate medical education of the University of Michigan, Ann Arbor, and Wayne University College of Medicine.

Research on Heat Transfer

A NEW joint industry education enterprise has been established at Purdue University for the "intensive training of graduate students in exploring the field of heat transfer for data upon which many of the practical developments of the future depend." Made possible by a $75,000 grant from the Westinghouse Electric & Manufacturing Company, the five-year training and research program will be directed by DR. GEORGE A. HAWKINS, of the Purdue faculty who has been appointed Westinghouse Research Professor in Heat Transfer. DR. MAX JAKOB, of the Illinois Institute of Technology, described as "one of the world's greatest authorities on heat transfer," will cooperate with DR. HAWKINS in the capacity of non-resident Research Professor.



The doctor on the home front wins many a battle . . . yet he fights a war that goes on and on. Thanks to the progressive march of science, he is well armed to combat the ills that afflict mankind.

Consider x-ray, the modern weapon. Radiographs... like aerial views from a front line reconnaissance flight... reveal the character of "enemy" positions. They permit of planned approach... remove uncertainty and provide a sound basis for successful attack.

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To assure clear, sharp and contrasty radiographs, examine your intensifying screens. Dirty, scratched or stained screens produce inferior results. Replace worn screens now. Your dealer has an ample supply.

A booklet, "Minutes that Matter," tells how best to care for intensifying screens. We'll gladly mail you a copy on request. Patterson Screen Division of E. I. du Pont de Nemours & Co. (Inc.), Towanda, Pennsylvania.

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Light the paths of X-Ray

Better Things for Better Living . . . *Through Chemistry*

All THE VIRTUES OF Coal Tar

DERMATOLOGISTS seem agreed that "the therapeutic action of coal tar depends on the aggregate effect of its components."

Hence the necessity for a preparation "delivering" a *whole* coal tar (not a fractional distillate), in order to achieve maximum antiseptic, antipruritic, keratoplastic and reducing action.

Daxalan is such a comprehensive agent—preferred by many outstanding clinicians because it is rigidly standardized as to physical and chemical characteristics, and is a delightfully smooth, homogenous, almost black (not light green or white) ointment.

Results from Daxalan applications in *psoriasis, eczema, dermatitis* and similar affections, have been excellent.

May we send a trial supply?

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Industrial Medicine March, 1944,

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We are, therefore, asking our readers to help us out by returning their copies after they have been read.

For every one received by us in usable condition we will send by return mail our check for the full price, 50 cents per copy.

The same price will be paid for a limited number of issues of October, 1943, and November, 1943.

Industrial Medicine
605 N. Michigan Ave., 11, Chicago

THE reorganization of the Public Health Service effected by action of the 78th Congress became operative on December 30, 1943. Under the new plan of administration, the present structure of the Industrial Hygiene Division, with the exception of the Research Section, becomes a Division of the Bureau of State Services. The Research Section remains in the National Institute of Health and will be known as the Industrial Research Laboratory. Medical Director J. G. TOWNSEND, who heads the Division, has announced the following personnel in charge of the Sections and Units which comprise the reorganized Industrial Hygiene Division: Dermatoses Section (formerly the Dermatoses Investigation Section) — Medical Director LOUIS SCHWARTZ; Field Operations Section (formerly the States Relations Section) — Senior Sanitary Engineer J. J. BLOOMFIELD; Medical Unit—Surgeon W. C. DREESSEN; Engineering Unit—Sanitary Engineer (R) HARRY E. SEIFERT; Statistical Unit—Principal Statistician W. M. GAFAFER; and Chemical Unit—Senior Chemist F. H. GOLDMAN.

COMMENT and OPINION

OLD FOGY that I am, I can remember when an industrial nurse's chief stock in trade was a big bottle of aspirin, a supply of roller bandages, and time on her hands. 'Tain't so, nowadays! Especially if you work in a defense plant. In the first place, you can't get in unless you have a past as pure as Whistler's Mother, and you can't stay in unless you know your stuff and have indestructible arches, and you can't get out until a business associate of J. Edgar Hoover gives you a final O. K.

—ROXANN, in *R.N.*, quoted in *Hospital Topics & Buyer*, February.

WOMEN may be contributing a lot to the war by their work in industry now, but unless they contribute more to the solution of their own problems, industry isn't going to want them after the war is over, says a trade union official. Both labor and management are disgusted with the way women have turned to the men in unions and in industrial management for the answer to every problem. Even the question of equal pay for equal work was argued by and settled by men. Not a single woman appeared to advance the views of her sex before the War Labor Board.

—*Hospital Topics & Buyer*, February.

Experts?

MORE than one-third of all the doctors in the United States have joined the armed forces. Thousands of others are still being called out of private practice. Late last year experts warned a U. S. Senate committee that public health would be in danger if the proportion of doctors in the U. S. A. fell below one to every 1,500 civilians. This month, that danger line has been crossed by 28 of the 48 states. "The doctor shortage is at its worst in small towns and in the open country. Even before Pearl Harbor, six states with a population of 11,500,000, largely rural, had less than one doctor for every 1,500 residents. The 28 states with dangerously small proportions of physicians today have a civilian population of 54,500,000, nearly half of the nation's total. It takes at least six years to train a doctor for public practice. If the armed forces enlist medical students at the present rate, the nation, according to G. St. J. Perrott and Burnet M. Davis of the U. S. Public Health Service, will be face to face with a shortage of another 15,000 physicians to handle normal illnesses, let alone an epidemic or other war emergencies."

—*Pathfinder* release.

"Full Money's Worth?"

AT THE end of 1942 fiscal year the assets (reserves) of the Social Security trust fund were *three billion two hundred and twenty-seven million dollars*, the withdrawals for the same fiscal year were a measly 141 million. I grant that there was high employment but the differential is astounding. Furthermore, the receipts of the Social Security Board for this same fiscal year amounted to 972 million dollars—in other words, less than 15% of the payments made by employer and employee contributions during the year were returned as benefits. *Is this the "full money's worth" for the worker as requested by the President?*

—From a letter by RAY F. MCCARTHY, in *Weekly Bulletin, St. Louis Med. Soc.*, February 18, 1944.

Not Physically Poisonous

THE U. S. Public Health Service held a series of "patch" tests, during which the new OPA "tokens" were taped to volunteer subjects and allowed to remain in contact with the skin long enough to demonstrate whether a reaction would occur. They failed to irritate or sensitize the skin of any of those on whom they were tried. A study of the raw materials and the finished tokens has been under way for more than five months. Investigations before and after manufacture was begun revealed that neither the materials nor the finished tokens are harmful if used as intended. Before manufacture, the specifications on which bids were invited included a guarantee that the tokens "be non-toxic and non-poisonous or otherwise not detrimental to the public health or welfare." Also that they "be chemi-

cally inert under all normal conditions . . ." The process by which they are made seals them with a "film of regenerated cellulose" that is "practically impenetrable."

Penicillin Plus

NEW biologic extracts which may be "even more powerful than penicillin or which may have a wider range of activity" were forecast by DR. THEODORE G. KLUMPP, president of Winthrop Chemical Company, New York, in a paper read February 22 before the Academia de Ciencias Medicas, Fisicas y Naturales de La Habana, Cuba. "Already there have been discovered at least two substances, clavacin, isolated from culture of Aspergillus clavatus, and flavicin from Aspergillus flatus, which show promising anti-bacterial properties. Although these have not yet been used clinically, from experimental studies they appear to destroy other species of pathogenic bacteria which are resistant to the action of penicillin. Just as sulfonamide compounds, having a progressively wider range of activity, were rapidly developed following the discovery of prontosil, so the advent of penicillin opens the door to another era in chemotherapy. Penicillin is not the end, but the beginning. The road has been found. The first firm step has been taken. The horizon is limitless."

Urine Studies

THE value of the "routine" urine examination is obvious. Less well known is the fact that the urine may show appreciable amounts of ingested or inhaled toxic agents. Here it is important to know the acceptable normal amounts excreted of some toxic agents which may enter the body other than those which enter due to industrial exposure. Thus, many persons ingest appreciable amounts of lead even though they have no industrial exposure to lead. However, they excrete this lead in minute amount constantly. Therefore, one must know how much the alleged case of industrial intoxication is excreting. Some substances excreted in the urine are never present in those persons not industrially exposed. Further one finds in the urine products of metabolism of the toxic agents. The increase of hippuric acid due to toluol exposure, and the increase of urinary organic sulphates at the expense of the inorganic sulphates in benzol exposure are examples of this phenomenon. In the case of the latter it is now known that the value of this test depends on its being performed on urine collected during the period of suspected exposure and that it shows that absorption of benzol has taken place. A positive urine sulphate test does not mean that poisoning has occurred; nor does it, in benzol-poisoning, give a positive result in cases which have been removed from

"my lips are for you . . . and you alone"

Until V-day arrives, America's fighting forces have first call on the health-protection and convenience of Dixie Cups and Containers.

Industry deserves second right... and is getting it. Millions and millions of Dixies are being delivered regularly to war plants. Here they simplify and speed up the feeding of the countless legions of essential workers...saving precious hours in the cafeterias, at the mobile feeding units and water coolers.

Yet still more important, Dixie Cups are a vital factor in preventing the spread of contagious illnesses thru indirect mouth-to-mouth contact. For each Dixie Cup is used but once—and thrown away.

We suggest you keep on asking for Dixie Cups even though they are hard to get. We're doing our best to catch up. The war-needs come first, then our old and regular customers. So keep on asking —maybe next time your Dixies will be available.

Dixie and Vortex Cups are made at Easton, Pa., Chicago, Ill., Darlington, S.C. and Toronto, Canada.

DIXIE CUPS

DRINKING CUPS AND FOOD CONTAINERS

Combined Local and Systemic Action

IN MYOSITIS; ARTHRALGIA; NEURALGIA

The patient with painful muscle, joint or nerve involvement appreciates the speedy and prolonged relief produced by Baume Bengue. Providing methyl salicylate and menthol in a lanolin base, it exerts a comfortable, warming counter-irritant influence which in addition encourages deep, active hyperemia. Through cutaneous absorption of its methyl salicylate, Baume Bengue induces systemic analgesia, thus allaying the discomfort of myositis, arthralgia, and neuralgia. Patients exposed to the vigors of inclement weather, and those working long hours in industrial plants, especially benefit from this dual action of Baume Bengue.

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exposure. Finally, in considering damage to the kidneys one should keep in mind the various kidney function tests.

—From "Use of the Laboratory as an Adjunct in the Study of Occupational Disease," by HARRY HEIMAN, M.D., in New York State Department of Labor's *Industrial Bulletin*, January, 1944.

Chest X-Ray Surveys

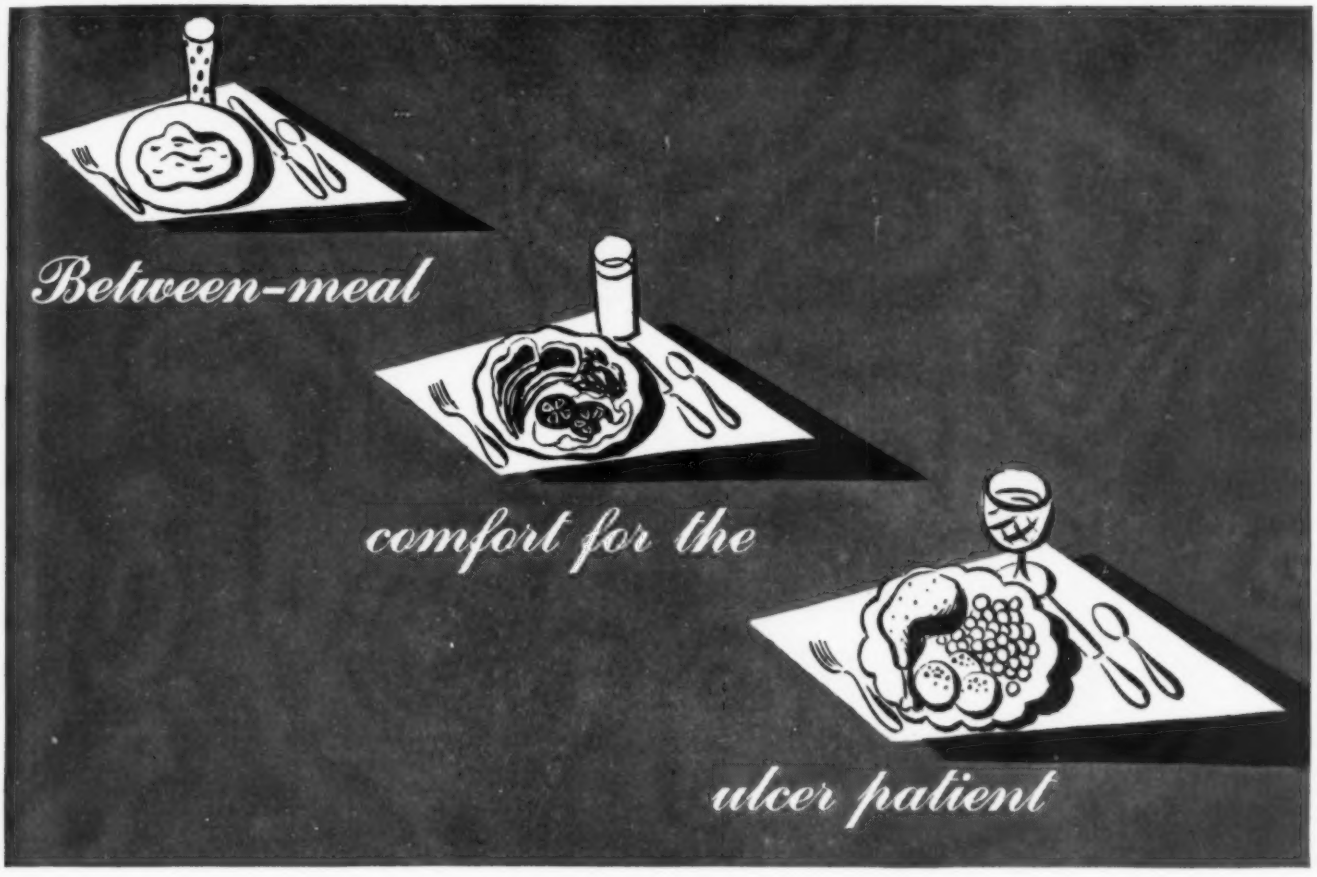
THE Department of Tuberculosis Control of the Connecticut State Tuberculosis Commission in cooperation with the State and local health departments, is now offering to Connecticut industries an opportunity to have all employees receive an x-ray of the chest. This service is aimed to protect the workers from tuberculosis. Facilities available for this work in Connecticut consist of a mobile x-ray unit housed in a trailer and manned by two x-ray technicians, a nurse, and clerical help. Films on each employee are taken at the place of work, either in the trailer, or in the plant building itself. The x-rays are taken at the rate of two every five minutes, so that little time is lost by each employee. The charge is $1.00 per x-ray. The surveys have been carried out during the past two years by the Department of Tuberculosis Control of the State Tuberculosis Commission in approximately 70 industrial concerns throughout the state. In these surveys, 2.3% of the employees x-rayed were found to show x-ray evidence of significant adult type of tuberculosis, and between 35-40% of the cases found have been active enough to require sanatorium care. In other words, approximately 0.8% of the employees in industry have tuberculosis requiring sanatorium care. To illustrate what one may expect to find in the course of such x-ray surveys, an analysis of 6386 individuals examined in industry follows. Some of the conditions noted represent serious conditions, others represent findings which may be serious, and still others are incidental findings of no particular significance to the individual.

	Number	%
Total number x-rayed	6386	100.0
Number with positive findings	827	12.9
Tuberculous:		
Primary	377	5.9
Reinfection	146	2.3
Minimal	100	1.6
Moderately advanced	30	0.5
Far advanced	10	0.1
Silico-tuberculosis	5	0.08
Unclassified	1	0.01
Extra pulmonary	3	0.05
Diagnosis deferred	27	0.4
Other:		
Silicosis	4	0.06
Pleuritis	102	1.61
Pneumonitis	13	0.20
Calcification	3	0.03
Generalized fibrosis	1	0.01
Bronchiectasis	1	0.01
Atelectasis	1	0.01
Emphysema	3	0.05
Hydropneumothorax	1	0.01
Cardiac abnormality	13	0.20
Hodgkin's disease (?)	1	0.01
New growth	1	0.01
Mediastinal mass	2	0.02
Foreign body	1	0.01
Pleural cap	1	0.01
Azygous lobe	1	0.01
Diaphragmatic hernia	2	0.02
Paralysis of diaphragm	1	0.01
Abnormal breast shadow.	1	0.01
Scoliosis	70	1.12
Bony abnormality	51	0.74

—From "Chest X-Ray Surveys in Industry," by PAUL S. PHELPS, M.D., in *Connecticut Industry*, February.

State Activities

IN LOUISIANA a revision of the Sanitary Code of the Department of Health includes a new chapter on Industrial Health. Legal authority to enforce regulations concerning industrial hygiene has become effective since the State Department of Health has approved the revised code. Occupational diseases have been added to the list of reportable diseases. . . . IN SOUTH CAROLINA the Division of Industrial Hygiene has compiled and published in a pamphlet, the rules and regulations of the South Carolina Board of Health governing industries. Three textile corporations owning several plants in the state have requested the Division to prepare an outline plan for medical provisions for plants and mill villages. . . . IN PENNSYLVANIA a survey of dental and nutrition programs existing in industrial plants at present is being conducted by the Pennsylvania Bureau of Industrial Hygiene through its Dental Consultant and its Staff Nutritionist. . . . IN WEST VIRGINIA the bureau of Industrial Hygiene, in cooperation with the Tuberculosis Unit of the State Health Department, is making a number of industrial x-ray surveys. . . . IN OKLAHOMA a program of mass



An unbroken cycle of comfort is the goal of the "continuing" action of Malcogel.* Throughout the trying between-meal period Malcogel's combination of acid-neutralizing magnesium trisilicate with rapidly acting aluminum hydroxide helps to free the patient from gastric distress.

Relief with Malcogel is distinguished by the absence of many faults inherent in earlier forms of therapy.

Malcogel does not produce an acid rebound
Malcogel does not cause alkalosis
Malcogel does not have the constipating tendency of simple alumina therapy

Pleasantly and simply Malcogel's prolonged action protects and soothes the injured mucosa to achieve an unbroken cycle of comfort and an early rehabilitation of the patient.

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NEUTRALIZE THE AXIS—BUY MORE WAR BONDS

two short cuts in URINALYSIS

Galatest
(DRY REAGENT FOR URINE SUGAR)
Time involved—30 seconds

THE NEW
Acetone Test
(DENCO)
Time involved—one minute!

Acetone Test (Denco) and its companion product Galatest are two tests which are rapidly simplifying "routine" urinalysis in doctors' offices, hospitals, and induction centers — every place where speed and accuracy are of vital importance.

Acetone Test (Denco) detects the presence or absence of acetone in urine in one minute. Color reaction is identical to that found in the violet ring tests and equally easy to differentiate. A trace of acetone turns the powder light lavender—larger amounts to dark purple. Acetone Test (Denco) is available in vials containing enough powder for over 125 complete tests, also in combination kits with Galatest.

Write for descriptive literature to The Denver Chemical Mfg. Company, 163 Varick Street, New York 13, N. Y.

Acetone Test
(DENCO)
Galatest

A carrying case containing one vial of Acetone Test (Denco) and one vial of Galatest is now available. This is very convenient for the medical bag or for the diabetic patient. The case also contains a medicine dropper and a Galatest color chart. The handy kit or refills of Acetone Test (Denco) and Galatest are obtainable at all prescription pharmacies and surgical supply houses.

THE SAME SIMPLE TECHNIQUE FOR BOTH TESTS
1. A little powder 2. A little urine *Color reaction instantly*

Accepted for advertising in the Journal of the A. M. A.

chest x-raying is now in force among employers of labor (of 50 or more) in Oklahoma County. The work is being handled as a joint endeavor of the Divisions of Industrial Hygiene and Tuberculosis Control of the State Department of Health.

—From *Industrial Hygiene*, February.

Insurance Not Enough

THE small plant is rarely large enough to warrant the employment of a full-time safety engineer. Many small plants, however, have found that certain effective safety activities can be developed easily and successfully carried on by the management without undue burden. The problem would be greatly simplified if more small-plant executives were educated to the fact that accidents are expensive and that the efficient plant is a safe plant. Too many in management are still of the belief that their compensation insurance cost comprises the entire accident cost. It has been conservatively estimated that this direct, insurable cost, represented by workmen's compensation insurance premiums (covering compensation benefits and medical expense) is only about one-fifth of the total accident cost, that the "hidden," indirect, uninsured costs are four times as great as the direct cost. The cost accounting in the average small plant fails to consider the fact that in small plants and large ones slowed-up production, spoilage of material, lowered efficiency, damage to tools and equipment, replacement of injured employee, loss of time by supervising personnel, lessened morale, and other factors usually enter into the total cost of industrial accidents. Managers who realize the significance of this 4:1 cost ratio, who understand that accidents are a direct indication of inefficiency, and who take measures to prevent their recurrence, find that certain simple and proved safety activities are essential, and that safety is an integral part of the production problem.

—*Specialty Salesman*, March, 1944.

Noise

MORE factory experience turns up every day to prove as hard fact what was regarded as theory not very long ago—that noise boosts costs by lowering efficiency. It causes fatigue which shows up in more rejects, more accidents, reduced output. Labor, too, is taking a livelier interest in industrial noise. Some unions already have begun pressing for management action against unnecessary production noises. That gives industry two important and practical reasons to correct excessive noise conditions wherever they may exist: lower costs and better employer-employee relations. There are four general methods—with usually two or more combined—to wipe out unwanted sound: (1) Isolate vibrating machines by putting them on damping mounts of rubber, cork, springs, or other material. (2) Provide insulation-enclosures for noisy operations. (3) Apply acoustical treatment to walls and ceilings. (4) Maintain machinery to eliminate noise from worn gears and other loose parts. Sounds that are intermittent, particularly those of high frequency, are especially irritating. By eliminating them, even though the over-all noise is not appreciably reduced, real relief for workers may be found."

—Connecticut General Life Insurance Company's *Notes and Quotes*, quoting *Modern Industry*, 12-15-43.

Committee Vitamins

WORKERS at Stromberg-Carlson, who are receiving free vitamins from the labor-management committee to cut unavoidable absenteeism due to colds, are so sold on the idea that they are buying hundreds of 100-tablet bottles of tablets a month for their families, according to the executive secretary of the company's labor-management production drive committee. The workers are being given the vitamins as part of a 130-day test to determine whether vitamins can help build resistance to colds and other respiratory infections that produce more than three-fifths of the unavoidable absenteeism in the Rochester war plant. Avoidable absenteeism is running currently below 2%. A labor-management survey in 1943 showed that 60% of all the absenteeism in the plant was due to sickness, and that more than two-thirds of the sickness was due to colds. To help combat these colds the

For wartime working efficiency

Pluravit, the "different" multiple vitamin supplement, was developed especially for industrial workers.

The daily Pluravit ration is only one pellet per day per worker. Experience has demonstrated that this will effectively prevent vitamin deficiency. As a result workers not only enjoy better health but are likely to find greater enjoyment in working, so that production can be maintained at peak levels.

Available in convenient, sanitary cellophane pouch containing 7, 14 or 28 pellets (for one, two or four weeks' supply), in bottles of 30, 100 and 1000 pellets.

One PLURAVIT *pellet contains:*

Vitamin A	5000 U.S.P. units
Vitamin B_1	2 mg. (666 units)
Vitamin B_2	2 mg.
Vitamin B_6	0.5 mg.
Calcium Pantothenate	1 mg.
Niacinamide	20 mg.
Vitamin C	50 mg. (1000 units)
Crystalline Vitamin D_3	1000 U.S.P. units

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Decisive 4

Prescribed with increasing frequency in arthritic cases, Occy-Crystine serves four important therapeutic objectives . . . .

WAY ACTION IN ARTHRITIS

1 It quickly relieves colonic stasis by catharsis,
2 It markedly improves liver and gallbladder function,
3 It stimulates renal clearance of toxins by diuresis, and
4 It releases colloidal sulfur, so frequently deficient in the arthritic economy. *Try it in your next case!*

Formula: Occy-Crystine is a hypertonic solution of pH 8.4, made up of the following active ingredients — sodium thiosulfate and magnesium sulfate, to which the sulfates of potassium and calcium are added in small amounts, contributing to the maintenance of solubility.

Trial supply and full data gladly sent on request to

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OCCY-CRYSTINE
the sulfur-bearing saline *detoxicant-eliminant*

labor-management committee provided free vitamins, and is using the months of January, February, March and April as test periods. It was in these months that colds ran greatest. The purchase of vitamins for their families at cost by workers, however, may cut absenteeism still further, it was said, as the survey revealed that one-sixth of unavoidable absenteeism was due to sickness in the family, which forced working mothers to stay home and take care of children.

—News Bureau release.

But They Vote

THERE is one irrevocable fact that absolutely condemns the Wagner-Murray-Dingell bill, which, if passed, will strike deeply at the roots of American individualism and tend to pauperize us as well as to narcotize our heritage of independence. The present war has emphasized a fact that medical men have been cognizant of for a long time, and that is, comparatively very few men have what it takes to stand on their own feet in life and not lean on someone else. This is particularly true in the matter of earning a livelihood. Many of those who are now looking to the government (supported by you and me) to provide for them have leaned on others all their lives. They have never been self-sufficient. Leaning, in the sense that we are using it, is the habit of expecting (even demanding) others to do for you those things which you *should*—and *could* and *would*, if you were decent—do for yourself. Leaners are found in all walks of life and in every social and business contact. Many a decent man is contributing to the support of a score of personal Leaners, related by blood or marriage, in addition to assisting, through taxation and donation, Leaners in general. The Leaner is particularly marked in business. Millions in stores, offices and factories will never get anywhere because of their leaning proclivities. Give a man a job to do. The chances are that before he is through with it you will feel that you might better have done it yourself. Far too few there are who can be trusted to go ahead and deliver the goods; of whom you can say to yourself, "Well, I've turned that over to Blank and now I can forget it." If you do not believe this, scrutinize the disgraceful record of our strikes in essential industries while our boys in the service are laying down their lives for their country. The full-fledged Leaner believes that the world owes him a living. He didn't ask to be born, and now that he is here he's entitled to what he likes to speak of as "his share." If he has to work for that share, he's being exploited. If he refuses to work and something is done about it, he's being persecuted. It only remains for a highly paternalistic government through pernicious legislation to encourage this unhappy human trait by offering "free medicine" coupled with unemployment insurance and further extension of Social Service and the American public will see a fertile field for malingering and pauperism, the like of which the world has never seen before!

—"Most of Us Are Leaners," in *Texas State J. Med.*, January.

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Purchasing Power and Shortages

MODERN history records the fact that after all great conflicts there follows a period of great business activity. Only in duration and intensity does the pattern vary. All the circumstances point to a repetition of this pattern at the end of the present conflict, but on a greatly intensified scale. No former war has seen such a great concentration of economic forces directed towards a single objective and one not in any way concerned with the normal peacetime needs of the people. Moreover, in the 25 years since the last conflict our productivity has enormously expanded, not only in aggregate volume but in variety. In World War I American industry was just preparing to change over to total war production at the time of the armistice. The present conflict finds it already completely converted. Our participation in the former war was for only a relatively short period—already exceeded in the present war. There will have been practically no consumer durable goods such as motorcars, electric refrigerators, etc., produced for several years. All such needs must be deferred in favor of the war effort. It is clear that an enormous potential demand for all kinds of goods and services is developing. Assuming the war continues until the end of 1944, it is estimated that wartime savings of individuals will be about 100 billion dollars. A considerable part of this will be in liquid assets—in banks, savings deposits and war savings bonds. Consumer indebtedness will have been largely liquidated so that the reservoir of installment purchasing power will be refilled. Similar accumulations by business and industrial corporations are estimated to add 30 billion dollars more. Superimposed upon all this there will be in all likelihood a foreign demand resulting from the same fundamental cause—shortages—plus destruction resulting from the war, the amount of effective demand being limited however by the nature of the economic settlements of the war and the ability of other nations to buy, or our willingness to give. Hence, it

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Illustrating a compression Foille dressing upon an extensive second degree burn of the left thigh and leg.

This analgesic, antiseptic and easily applied water-in-oil emulsion, whose value in burn therapy has been repeatedly stressed in the literature (1, 2, 3, 4, 5), fits ideally into the pressure dressing technic.

Thus an authority[6] states: "Recently we have begun to apply to the deeper and more extensive lesions an inner layer of several thicknesses of Foille-saturated gauze, and over this a thick, sterile compression dressing of gauze and cellucotton, the whole to be left undisturbed for ten to fourteen days.

"Allen and Koch and Silver have emphasized the fact that compression dressings reduce the exudation of plasma into the burned area. After the removal of this initial compression dressing, the burn is kept constantly moistened with the agent and left exposed to the air beneath a cradle."

Available in 2-oz., 4-oz., pints, quarts, gallons, 5-gallons.

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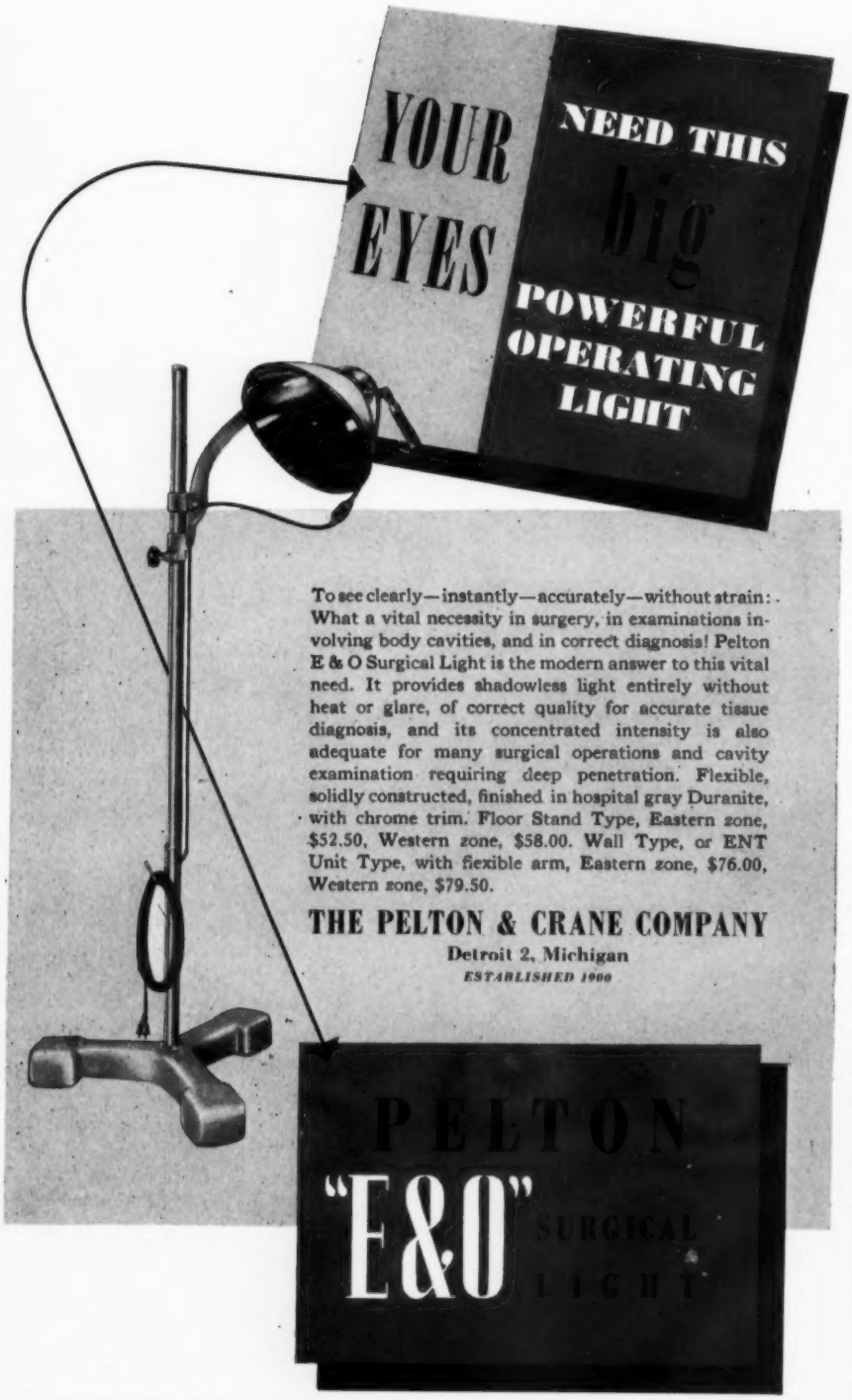
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appears to be clear that there will be ample purchasing power already created to keep our enterprise system active for a period of a limited number of years. To the extent, of course, that the price level is permitted to rise, owing to inflationary forces existing, the real purchasing power of these savings is correspondingly reduced. Jobs in all likelihood will be available to insure high employment in the period of shortages. However, owing to the fact that centers of war production have not in all cases coincided with the centers of civilian production, important geographical problems of unemployment will of necessity arise. Also, certain peacetime industries undoubtedly have expanded their wartime employment beyond any peacetime needs. Major adjustments will be necessary.

—From "Postwar Jobs," by ALFRED P. SLOAN, JR., General Motors Chairman, at Economic Club of Detroit.

Security Plan

A COMPREHENSIVE security plan which will protect all International Business Machines Corp. hourly wage employees in the event of illness or injury from any cause has been announced by Thomas J. Watson, president. The plan provides regular 40-hour standard pay for a period of six months for every employee absent from work because of illness, except for the first three working days, when the compensation will be $3 a day. Further individual consideration will be given to cases lasting more than six months. "As regards accidents," said Mr. Watson, "we are going to add to the amount received as compensation insurance enough to make up your regular pay, so that you will receive the same compensation when you meet with an accident in the factory as I have announced in connection with illness." In the case of accidents which occur outside of factory activities, employees will receive the same benefits as during illness.

—*New York Herald-Tribune*, February 25.

Safety Record

IN A REPORT covering all of the Westinghouse Company's 27 manufacturing plants and repair shops, H. B. DUFFUS, safety engineer, reveals that the lost time accident rate for 1943 was less than 5 per million hours of work as compared with 5.2 for last year. A total of more than 243 million man-hours was worked in all Westinghouse plants during 1943, an increase of 25% over 1942's total of approximately 195 million. "More than 17,000 new employees joined the company last year. A great part of these were women, men previously inexperienced in industrial work, and others hired to keep pace with expanding production. To cope with this unique situation, safety engineers stepped up their educational campaign, increased the number of precautionary measures throughout the plants, and found new and safer ways of performing industrial tasks." Best safety record in the company is held by the Printing & Publishing Division of the East Pittsburgh Works. With 350 employees, it is well into its sixth "perfect" year, having worked over 4,000,000 consecutive man-hours without a lost-time accident.

Facts versus Ballyhoo

DURING the last six months the National Physicians' Committee has engaged the Opinion Research Institute, which is a subsidiary of the Gallup Poll, to conduct a survey of public opinion regarding various phases of medical care. The preliminary results were so astounding that a further survey was made, which covered every section of the country thoroughly, so that there was no doubt as to the accuracy of the results. The results of this survey have been, in many instances, quite contrary to opinions which have been expressed previously, particularly by certain agencies in Washington. Contrary to statements emanating from that source, the great majority of laymen are not in favor of Federal control of medicine or of compulsory sickness insurance. Surprisingly enough, this includes the laboring class, who apparently do not agree with their leaders. The great majority of citizens are satisfied with most of the features of the

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not only provides high germicidal potency—prolonged immersion of delicate steel instruments will not result in rust or corrosive damage. Obviously, the functional efficiency of any instrument depends upon such protection of its inherent factory qualities during the sterilizing process.

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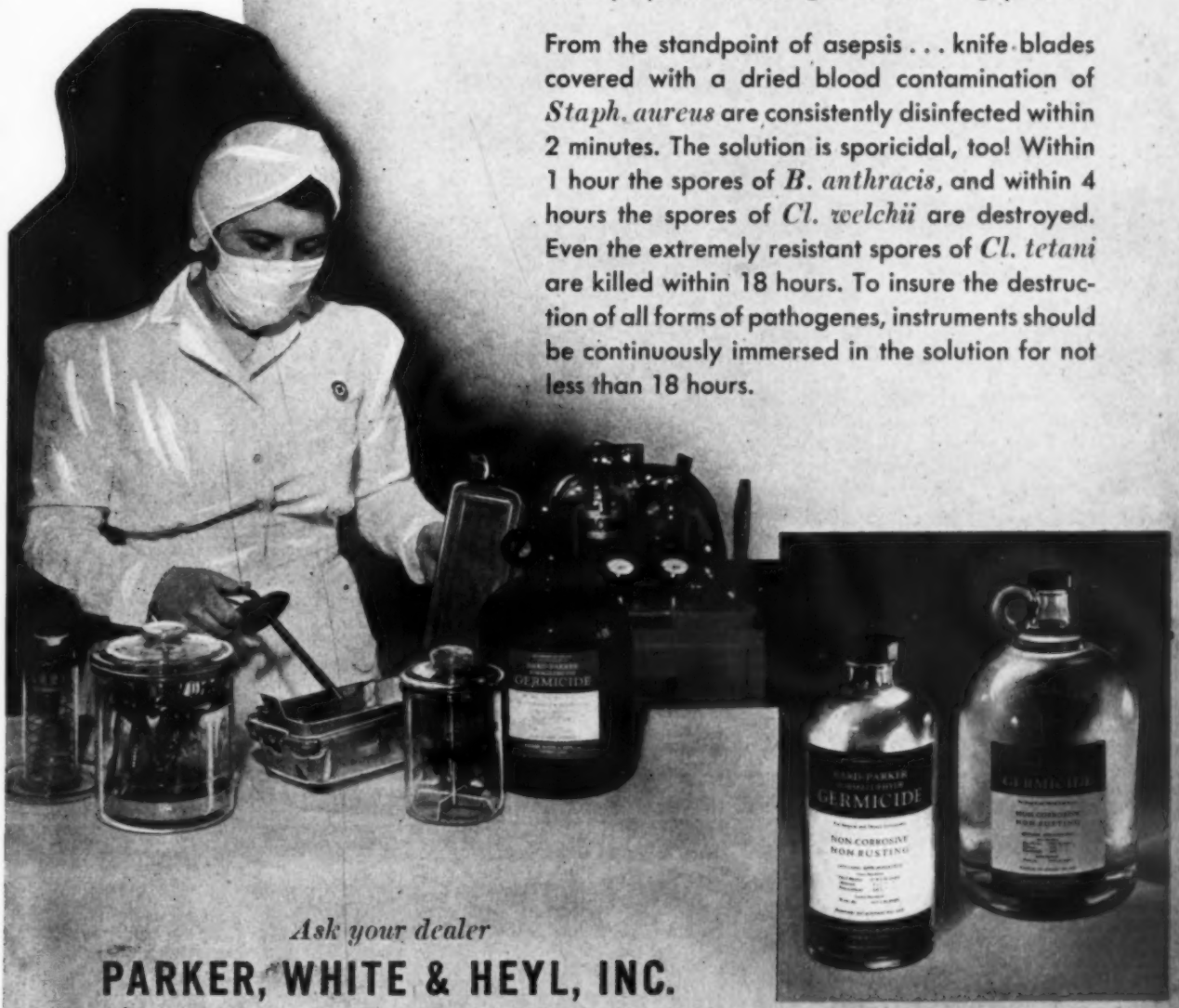

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present form of medical care. There is, however, concern on the part of a great many as to their ability to meet the cost of catastrophic illness. The desire for some form of insurance, voluntary and not compulsory, and at a figure they could economically support, was expressed by a large section of those interviewed. It is also of interest that the American Medical Association was not regarded as a medical trust, as has been ballyhooed from Washington, but that its objectives met with the approval of the great majority of laymen who are acquainted with it. This information, together with much more, will be given to the press at a conference to be held in New York in the very near future.

—From "The National Physicians' Committee," by W. F. BRAASCH and F. J. SAVAGE, in *Minnesota Med.*, March, 1944.

Carbon Tetrachloride

A STUDY of exposure to carbon tetrachloride recently made by the Oregon Division of Industrial Hygiene resulted in the same conclusion as was reported in an account of poisoning in a parachute factory given in the January "News Letter." (See also INDUSTRIAL MEDICINE, February, 1944, pp. 184-192.) Needless use of this toxic substance was responsible for illness and lowered production. In the plant studied, carbon tetrachloride was added to cutting oil, white lead in oil cutting lubricants, or used straight as a cutting tool lubricant. The lubricants were applied variously and intermittently by brush, squirt can, or continuously through the piped, circulating system, for the machining of parts requiring a high degree of finish. The carbon tetrachloride is said to undergo thermal decomposition at the point of the cutting tool, and to form a metallic chloride film which is very strong and thus permits high finishes to be attained with greater depths of cut and cutting speeds than could be used otherwise. The percentage of carbon tetrachloride in the circulating systems was said to be about 4. However, it was observed in one instance that carbon tetrachloride, practically undiluted with cutting oil, was being piped to the cutting point. Approximately 150 employees working in or near the machining departments reported to the dispensary, headache and nausea being the predominant symptoms. Three cases of gastric hemorrhage, including two instances of perforated gastric ulcers, were attributed to the inhalation of carbon tetrachloride vapor. Atmospheric samples taken at breathing level with a portable combustion-absorption apparatus showed the following ranges and averages of concentrations for the various conditions listed: General atmosphere—5 to 55 ppm (30 ppm av.); Machining with brush or squirt can application—20 to 220 ppm (80 ppm av.); Machining with circulating lubricant—10 to 310 ppm (125 ppm av.). The use of carbon tetrachloride was discontinued upon recommendation that this be done and that adequate local exhaust ventilation be installed. It has been reported that the discontinuance has not affected the quality or speed of production.

—From *Industrial Hygiene*, February.

Turnover

OWI figures on current labor turnover show that, for each 1000 workers employed, 43 quit each month; five leave to enter the armed forces; six are discharged; 51 are hired, and nine are laid off. Among the reasons: "Increased wartime employment has brought into the labor force many types of workers not accustomed to regular hours and work. Some are housewives who take war jobs because of patriotic motives, economic necessity, or to earn a little extra money. Women often follow their service husbands from locality to locality, taking jobs and then leaving them when their husbands are moved. Women also often have household or afterwork duties which make regular employment more difficult than for the normal peacetime worker. The job opportunities also have drawn many persons who lack the self-discipline,

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Each fluid dram contains

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Two teaspoonfuls as directed
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determination or health of the normal worker. Some war workers lack the home ties that most normal workers have. In addition, many, unfamiliar with industrial procedures, are hired by labor-short employers for work to which they find it difficult to adjust themselves. . . . One shipyard which interviewed all workers who quit found that almost half of the women interviewed during one period were quitting after working a month or less. About 90% left in the first six months. Of the 395 women interviewed, 49 quit because the work was harder than they had expected; 45 said they found the weather too hot for outside work (in winter, women quit because of the cold); 35 left to follow their Army or Navy husbands; 32 were leaving town; 23 could get no one to do their housework; 21 were in ill health; 20 asserted they were tired of working; 35 left to care for their children or some other member of the family; 13 got married; 11 announced they were 'dissatisfied with working conditions,' and 11 left without giving any reason. Other reasons, each of which accounted for less than 10 women quitting, were pregnancy, dissatisfaction with pay, objections of husband, dislike for fellow workers, work too noisy, work too dirty, lack of transportation, return to school, and acceptance of better job."

Medical Knowledge Pool

THE task which will lie before the United Nations after the liberation of Europe will include the immediate provision of medical supplies in as simple and easily transportable form as possible, and adequate scientifically balanced food. The health of millions of ailing and ill-fed peoples must be saved. This has been realized, and collaboration among the inter-Allied experts who have some idea of what they will find when they return, and scientists in this country, is increasing. In January, 1941, the Polish government accepted an offer from the University of Edinburgh to provide facilities for the establishment of a Polish School of Medicine. Announcing this, the University authorities declared that when Poland was freed from the German yoke she would be found "destitute of all means, human and material, for university teaching." Polish professors of anatomy, physiology, dentistry, and neurology, make up part of the staff, while professors of the Edinburgh University Faculty of Medicine undertake the teaching of subjects for which Poles are not available. Czech doctors in Britain, many of whom are serving in the forces or in hospitals and on ships, are carrying on the tradition of Czechoslovak medical research. The Czechoslovak Medical Association in Great Britain publishes special bulletins, wherein new methods and results of medical research are discussed. Czechoslovak doctors in Great Britain have published well over fifty scientific works, one of them is by a noted specialist on nutrition, another on lung and pleura diseases, a third on x-ray and ray therapy. A large hospital in East London has been entirely taken over by the Dutch for the use of Dutch nationals. These are mostly Dutch sailors, who have been wounded or exposed to bitter Arctic weather at sea. The hospital is run entirely by Dutch doctors and Dutch nurses, and even the cooks are Dutch. Other nursing homes all over Britain have been given to the Dutch, and are now being run by them.

—From *Talking Points*, Toronto.

Second Indiana Health Conference

INDIANA'S second state Medical Association Industrial Health Conference will be held in Indianapolis April 19 and 20, 1944. The program will cover the following subjects: (1) Records and record keeping in industry. (2) Industrial skin diseases. (3) Treatment of hand injuries. (4) Disability evaluation. (5) Lung changes in electric arc welders. (6) Value of industrial medical service. (7) Rehabilitation of the physically handicapped. (8) Aluminum therapy for silicosis. (9) Employment of handicapped individuals. (10) Undergraduate and post-graduate plans. The keynote of the program is the placement of the physically handicapped veteran in industry on his return from the battle front. The Committee on Industrial Health is definitely of the opinion that physicians and industry should plan and train for this event before the boys come home, and not wait till the war is over. Nationally-known speakers are being invited.

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The External Cod-Liver Oil Therapy

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Desitin Ointment contains Cod-Liver Oil, Zinc Oxide, Petrolatum, Lanum and Talcum. The Cod-Liver Oil, subjected to a special treatment which produces *stabilization* of the Vitamins A and D and of the unsaturated fatty acids, forms the active constituent of the Desitin Preparations. The first among cod-liver oil products to possess unlimited keeping qualities, Desitin, in its various combinations, has rapidly gained prominence in all parts of the globe.

Desitin Ointment is absolutely non-irritant; it acts as an antiphlogistic, allays pain and itching; it stimulates granulation, favors epithelialisation and smooth cicatrisation. Under a Desitin dressing, necrotic tissue is quickly cast off; the dressing does not adhere to the wound and may therefore be changed without causing pain and without interfering with granulations already formed; it is not liquefied by the heat of the body nor in any way decomposed by wound secretions, urine, exudation or excrements.

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WHEN THE PAINS OF SIMPLE HEADACHE OR MINOR NEURALGIA slow a worker down, try giving him quick, sure relief with a couple of Anacin. A great back-on-the-job prescription.

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This high local concentration is accomplished despite the fact that blood levels of sulfathiazole are extremely low and for the most part not quantitatively measurable.

Indications: Septic sore throat; acute tonsillitis, pharyngitis; infectious gingivitis and stomatitis caused by sulfathiazole-susceptible micro-organisms; prevention of local infection secondary to oral and pharyngeal surgery (e.g. tonsillectomy).

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An illustrated booklet covering the apparatus and equipment for various blood plasma procedures is now available. This booklet not only lists the basic apparatus but contains diagrams of donor, pooling and administration assemblies as well as full specifications on the apparatus. A convenient bibliography is included for those who wish to review the literature on the preparation of blood plasma. The equipping or remodeling of a blood bank and plasma processing laboratory is in reality a problem of plant engineering and requires a fairly wide range of apparatus and equipment. To better serve the laboratories installing a blood bank our technical staff has made a thorough study of the various processes now in use. These men will be glad to work with you in planning the new blood bank, in installing the equipment and in training your personnel.

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"All the Truth"

THE doctors were handed some bouquets and brickbats by O. A. WIESLEY, member of the Utah industrial commission in charge of compensation. He praised the profession generally for fine cooperation with the compensation division, but said some members are poor reporters or witnesses. Remarking he did not think any members of the profession would lie when testifying in compensation cases, he nevertheless expressed the view some of them do not tell all the truth. The commission, he asserted, is concerned only with seeking truth, and the medical profession should strive for the same goal. His advice to doctors appearing in cases before the commission was to tell the facts, and when they can't answer a question, to admit it. He urged doctors, insurance adjusters and others to impress on injured workmen that compensation is not damages and that negligence on the part of the employer has no bearing on the award unless it is wilful. In that case, 15% is added.

—*Salt Lake City Tribune*, January 20, describing the Utah Symposium on Industrial Health, January 19.

Wisconsin Conferences

WISCONSIN State Medical Society, in cooperation with the Industrial Hygiene Unit of the State Board of Health, has planned a series of afternoon and evening conferences on industrial health to be held at Kenosha, April 12; Manitowoc, April 19; Oshkosh, April 25; Green Bay, May 2; Janesville, May 16; and Wausau, May 18. The subjects will include "Treatment of Sprains and Strains"—"Cardiac and Hypertensive in Industry"—"Industrial Diseases of the Lungs"—"Treatment of Burns"—"Treatment of Injuries of the Hands and Feet"—"Prevention and Treatment of Industrial Dermatoses"—"Health Hazards in Welding." These are to be presented by DRS. J. M. KING, S.M. MARKUSON, E. W. MASON, O. A. SANDER, A. A SCHAEFER, C. C. SCHNEIDER, and MILLARD TUFTS, from Milwaukee, and DRS. G. A. COOPER, HELEN A. DICKIE, H. L. GREENE, V. W. KOCH, C. M. KURTZ, E. R. SCHMIDT, and A. R. TORMEY, from Madison. Each afternoon clinic will be followed by a dinner, and three short talks. Representing labor will be MR. GEORGE HABERMAN, president of the Wisconsin Federation of Labor. MR. W. D. JONES, of the James Manufacturing Company, Fort Atkinson, and MR. LOUIS HARKRIDER, of the General Malleable Company, Waukesha, will alternate as representatives of the Wisconsin Manufacturers Association. MR. FRANK GREENYA, of Milwaukee, and DR. PAUL BREHM, director of the Industrial Hygiene Unit of the State Board of Health, will speak on the importance of postwar planning in relation to the rehabilitation of war veterans in industry. And DR. H. A. VONACHEN'S sound film on Rehabilitation will be shown.

Can Do

MY FIRST employee was like myself, a handicapped man. He was deaf. Between us we worked out a scheme for putting handicapped people to work on the principle of finding the sort of job they could handle best rather than trying to fit them into any kind of job. That first helper is still on my staff. Now we have many workers who once believed they had no place in industry, who are satisfactorily filling jobs and doing their work as well as anyone could who was blessed with all his faculties. For instance, the mixing and processing in our laboratories is done by persons who are deaf. The maintenance man who keeps the entire plant's equipment in operation has lost his hearing. The machines are operated by persons with one leg or no legs at all, and by others who have been afflicted with infantile paralysis. Tasks which require a fine sense of touch and manual skill are being filled to satisfaction by those who are blind. One-armed employees are used to carry supplies. People afflicted with curvature of the spine and other handicaps are used on assembly work.

—GEORGE BARR, founder of G. Barr & Co., chemists, addressing Advertising Men's Post, American Legion, Chicago, March 19.

Dispensaries in Ecuador

FIVE dispensaries have been opened in northwest Ecuador for rubber workers, according to reports to the Institute of Inter-American Affairs, Washington. Seventeen dis-

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PREVENTS RECURRENCE AT NIGHT

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Magmasil, a palatable, stable aqueous suspension of hydrated magnesium trisilicate, neutralizes 86 cc. of N/10 HCl per teaspoonful. This action is exerted over fully four hours, permitting of fewer administrations, simplifying treatment.

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Magmasil therapy permits of early liberalization of the diet, a feature much appreciated by the patient, and leads to rapid healing.

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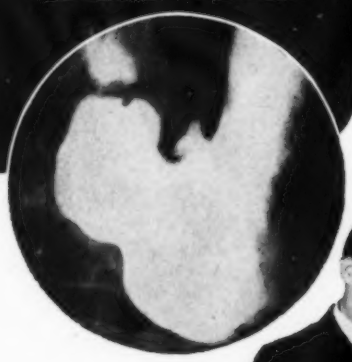

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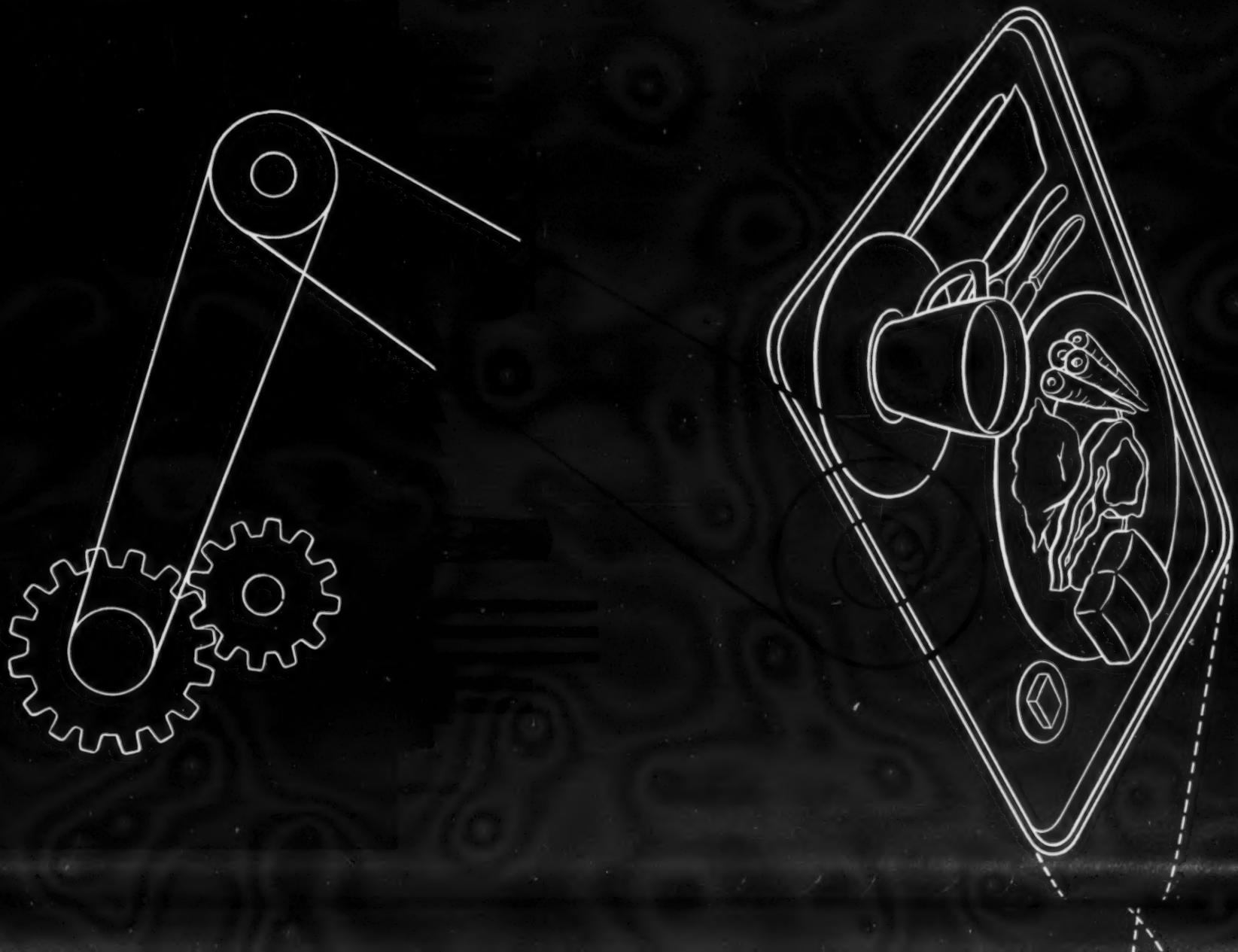

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INVESTIGATIONS in industrial plants reveal that malnutrition seriously hinders production.

That Vitamin B reinforcement is one of the outstanding needs in the present-day setup is attested to by various authorities: "When men are doing hard physical labor, even for a few days, there is an imperative need for an adequate daily intake of the vitamin B complex if physical fitness is to be maintained."†

Emphasized also by investigators is the need for the ***Whole*** B Complex:—

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238 pages; 30 illustrations

Sixty per cent of the adult population is said to be afflicted with pruritus perinei and yet the bedside physician does not know how to handle it. This important book is the first comprehensive monograph on this complex and distressing affliction. Published in 1938 at $5.00—Now..$3.00

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pensaries now are operating in the Ecuadoran rubber area through the cooperation of the Ecuadoran government and the Institute, which is an agency of the Office of the Coordinator of Inter-American Affairs. Each is staffed by a physician trained in tropical disease control, usually assisted by a laboratory technician. Dr. Curtis E. Sauer, head of the institute's medical section in the Ecuadoran area, reports that in one month 920 patients were treated. "Practicantes" have been stationed at six rubber centers. These are specialized medical assistants who distribute medicine and administer minor treatment.

CURRENT ARTICLES of QUALITY

Cadmium

DR. W. E. DOYLE, Bureau of Industrial Hygiene, Kentucky, "Occupational Diseases," in *Kentucky Med. J.*, February (42:2, 45-55). Read at the Post-graduate Extension Course sponsored by the Kentucky Medical Association, November, 1943. Extract: "The great increase in the use of cadmium, not only for coating marine hardware but also for many fittings that were formerly zinc coated, has created a new problem in industrial hygiene. Most cases of industrial cadmium poisoning have resulted from accidents or short exposure to excessive concentrations of cadmium dust or fume. Little is known of chronic effects upon humans. Acute industrial poisoning is characteristically produced by inhalation of the fumes, particularly where cadmium has been heated to give off the oxide in yellowish-brown fumes. The clinical picture is characterized by irritation of the respiratory mucous membrane which may eventually lead to pulmonary edema, pneumonitis, or broncho-pneumonia. The first symptoms are those of metal fume fever, usually dryness of the throat, cough, chills, headache, vomiting, and a sense of constriction of the chest. Later symptoms are predominantly referable to the respiratory system and are characterized by cough, pain in the chest, severe dyspnea, and prostration. A few cases have gastro-intestinal complaints."

The Occupational History

DR. J. G. TOWNSEND, Medical Director, Industrial Hygiene Division, U.S.P.H.S., "The Physician's Role in Industrial Hygiene," in *New Orleans M. & S. J.*, February (96:8, 360-365). Read at New Orleans Graduate Medical Assembly, 1943. Extract: "The opportunity which awaits every physician who is not in armed service is that he shall bring to the industrial plant the skills of his personal office; and, conversely, he must bring to his personal office the industrial knowledge of medicine for which there is so urgent a need. The necessity for obtaining an accurate and detailed occupational history cannot be stressed too strongly. Many a conscientious physician has taken pains to record the detailed personal and past medical history of a patient, and neglected to get information concerning the patient's exposure to toxic materials in industry. Such an occupational inquiry might result in the need to investigate the patient's working environment, or at least to get information from plant officials on this point. As a single example of the advantage of a detailed occupational history, a recent investigation by the Public Health Service indicates that manganese poisoning may often be mistaken for multiple sclerosis or Parkinson's disease. Whether you are a private practitioner or an industrial physician (and it seems both functions will have to merge, to meet the need) your prompt reports of the occurrence of occupational diseases are vital to the efficient functioning of your official health bureaus. State-wide, careful attention to such reporting builds up a 'backlog' of industrial epidemiologic data which may prevent the recurrence of such diseases."

Women's Coordinator

HELEN C. MCMANUS, R.N., Moore Dry Dock Co., Oakland, California, "Field Day for Nurses," in *Safety Engineering*, February (87:2, 53-54). Extract: "The qualifications required to become a women's safety coordinator are: Registered nurse with industrial experience, excellent health, emotional stability, poise, teaching ability, a pleasing personality, combined with a genuine liking for people, and a sincere interest in the betterment of their working conditions. This is a tremendous field—a new field—one of untold possibilities! This human relations type of work is interesting and fascinating, and there is a constant challenge to the nurse with ambition to strike out in a new field where the results will show, not in the recovery of a patient, but in lowered accident rates among our women industrial workers, and in a better understanding among these workers of the fundamentals of health, hygiene and nutrition."

Welding Fumes

DR. T. R. JONES, and DR. JESSIE A. LOCKHART, Houston, "An Occupational Disease of Electric Welders," in *Texas State J. Med.*, February (39:10, 532-534). Read before the Harris County Medical Society, February 9, 1944. Conclusions: "(1) The irritating gases of welding fumes are essentially ozone and

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Dupuytren — the great French surgeon — early recognized that pain is not only a symptom, but a pathogenic, destructive factor as well. This is especially true in hemorrhoidal conditions in which there is both pain and hemorrhage, and in which the venous engorgement is aggravated by the inflammatory reaction of the intensely irritated nerve endings.

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nitrogen oxides. Massive exposure produces acute pulmonary edema, acute bronchitis, bronchial ulceration and pneumonia. (2) Repeated exposure produces chronic bronchitis, pulmonary fibrosis, asthmatic wheezing and pulmonary emphysema. (3) The electric welding arc gives off small particles of iron which collect in the lungs and produce x-ray changes simulating silicosis. These iron particles are non-irritating and produce no disability. (4) Persons with arrested tuberculosis rapidly develop pulmonary hemorrhages when working around concentrated welding fumes. (5) The only effective treatment is cessation of exposure to welding fumes."

Finger Injuries

DR. JOSEPH J. TOLAND, JR., and DR. IGHO H. KORNBLUEH, Philadelphia, "Industrial Injuries to Fingers," in *Pennsylvania Med. J.*, February (47:5, 466-473). Extract: "The recommended technic of wound treatment is as follows: Each new patient with injuries to fingers must first have the wound carefully examined for possible fractures, severed tendons and nerves. Minor cuts or abrasions require cleansing and a dry sterile dressing only. A good dressing and elevation of the extremity will also control minor bleeding. The repair of greater wounds may be performed under local, but preferably under block or general anesthesia; the latter is obligatory in multidigital traumatization. The surroundings of the wound are then thoroughly cleansed with soap and water and the same procedure is very gently applied to the wound itself, which is afterwards rinsed with copious amounts of a warm sterile salt solution. Greasy fingers should also be cleansed with ether or the less expensive benzine, and then again rinsed with physiologic salt solution. The surrounding skin, but not the wound itself, may now be painted with an antiseptic solution. This method of wound cleansing as used and recommended by Koch, Allen, Buffington, Mason, Findlay, Davis, Griswold, Harmer, and others is still not generally applied. Where necessary, a débridement is performed, and devitalized tissue and foreign bodies are removed. Ligation of bleeding digital arteries is necessary only occasionally. Upon completion of the intended repair, the wound is closed, after careful approximation of the edges, with a few, loose, interrupted silk, wire, or multifilament nylon sutures. Too many and too tight sutures should be absolutely avoided. Clean wounds do not need drainage. Where a thorough débridement is impossible or the patient is seen too late, the wound should be kept open. Application of a sterile dressing with extensive use of vaselinated gauze, immobilization, and elevation of the extremity are the last steps in operative treatment of traumatic finger wounds. Injuries with extensive loss of tissue should be carefully cleaned and excised. Primary grafting is indicated where large areas are denuded and tendons, nerves, or bones are exposed. When a primary grafting is impossible, a conservative treatment should be instituted. In non-infected wounds, a secondary grafting may be performed after a few weeks. The technic of finger grafts is excellently described in most surgical manuals and by Terhune, Reed and Harcourt, and Jones, and others." (Reprints containing bibliography may be secured from the authors.)

Healthy Attitude

DR. D. L. HOSMER, "The Intelligent Care of Industrial Injuries," in *West Virginia Med. J.* (39:1-8, 1943), condensed in *Modern Med.*, February. Extract (from the condensation): "The doctor's contribution in development of a healthy mental attitude in the patient is intangible but important. An inadvertent remark about the hopelessness of a patient's condition may actually cripple him permanently. Essentials of psychotherapy include a simple, sensible description of the injury and a continuous interest in the patient's progress throughout treatment and convalescence. Cooperation between employer and physician re-

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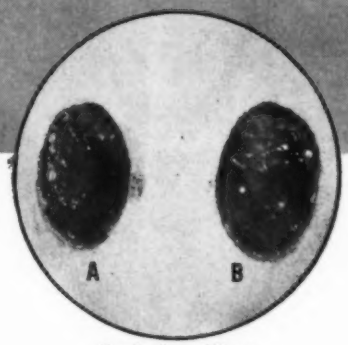

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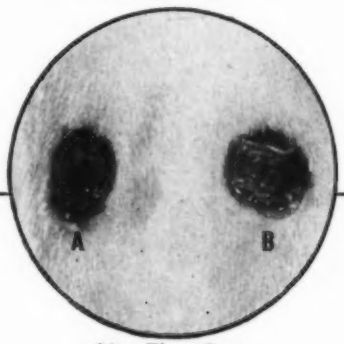

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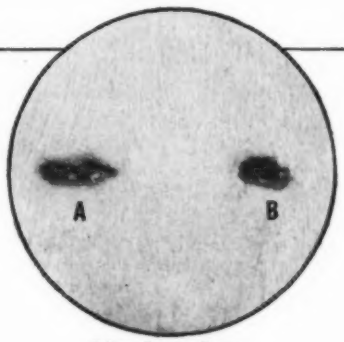

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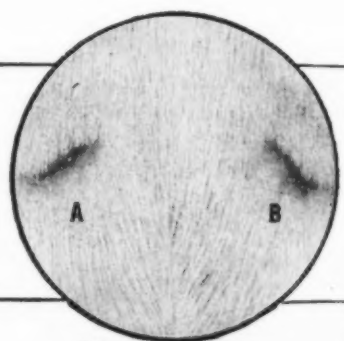

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duces the economic drain of injuries. The employer should depend upon the physician's opinion as to when a patient is ready to return to work, and for what type of work he is fitted."

Veteran Data

CHARLES B. COATES, Associate Editor, "Rehabilitation of Veterans Must Begin Now," in *Factory Management and Maintenance*, February (102:2). Extract: "The government is not likely to change its policy of keeping confidential the detailed data on a veteran's disability. Occasionally the authorities may be induced to supply details if the request from the management is supported by the veteran himself. But, by and large, these data will be withheld, especially if there is any chance that they may damage a man's chances of employment. Thus plant physicians must be retained to examine each applicant with the utmost care. And, again, the likelihood is growing that examining psychiatrists will have to be retained to determine the individual's psychological suitability for a job." (Reprints available.)

Value Received

DR. EDWIN W. GEHRING, Portland, Maine, "S1161," in *J. Maine Med. A.*, February (35:2, 23-25, 30). Read before Portland Kiwanis Club, December, 1943. Extract: "Even so, *obliged* to see those assigned to him as often as they desired, they being the taxpayers and he hired to work so many hours a day for a stipulated salary, the demands on his time would so *overwhelm* him that in *sheer desperation* patients would be treated quick and dirty. Let me illustrate what I mean by citing the case of a genial lodge doctor whom I met early one June morning several years ago as he trudged wearily homeward. I said, 'why so glum! What is so rare as a day in June?' He replied, 'I am just come from seeing a lodger who *thinks* he is sick.' Mind you, he, too, for a fixed sum a year, was expected to respond to as many calls as his lodgers chose to make. 'Tell me,' I said, 'did you ever figure up what your calls on these lodge members net you?' 'Yes,' he said, 'ten cents apiece, last year.' 'And how much was your service worth?' I inquired further. At this he looked about him to be sure that he might not be overheard and said, sotto voce, 'not quite ten cents.' There, in brief, you have the picture of what will happen to *doctors*, once they become regimented, socialized. *It cannot be otherwise.*"

The Common Cold

DR. LEMUEL C. McGEE, DR. J. E. ANDES, DR. C. A. PLUME, and DR. S. H. HINTON, Medical Department, Hercules Powder Company, "'Cold Vaccines' and the Incidence of the Common Cold," in *J.A.M.A.*, February 26 (124:9, 555-557). Authors' summary: "(1) Three oral vaccines and two vaccines for parenteral administration currently, offered as prophylaxis against the common cold were given clinical trials in a group of industrial and office workers during the October to April season of 1941-42 and 1942-43. (2) No clearly evident protection against the cold and related acute respiratory infections can be demonstrated in the results of this clinical trial at mass immunization. (3) The indiscriminate use of cold vaccine now available is not the answer to the problem of industrial absenteeism due to acute respiratory infections."

Non-Occupational Illnesses

DR. MILTON H. KRONENBERG, Chief, Division of Industrial Hygiene, Illinois Department of Public Health, "Working Conditions for Female Employees," in *J.A.M.A.*, March 11 (124:11, 677-682); discussion by DR. JAMES M. CARLISLE and ANNA M. BAETJER, SC.D. Extract: "Illnesses of non-occupational origin are by far the major type of sickness among any group of workers, and, in the case of women, this fact is even more striking. If efficient and continued production is to be obtained from women, it is these so-called non-occupational diseases that must be vigorously attacked. It is in the control of these diseases that man-

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agement will obtain the greatest economic benefits from its industrial health program. Therefore in the interest of both management and labor, health programs must transcend occupational disease control and include a broad program of general health maintenance."

The Individual Health Record

DR. MAX R. BURNELL, Medical Director, A. C. Spark Plug Division, General Motors, "Health Maintenance Program for Women in Industry," in *J.A.M.A.*, March 11 (124:11, 683-687); discussion by DR. LYDIA G. GIBERSON, and DR. H. A. VONACHEN. Extract: "Johnson has brought to our notice the information that '12 to 15% of employees cause 55 to 60% of the time lost by sickness. This small group is sickness prone and should be the choice for concerted attention along prevention lines.' Legge is of the opinion that 'the plant dispensary is the ideal laboratory to study patients who seek advice for trival complaints. This provides the opportunity to record and observe early symptoms, develop case reports, locate hazards and prevent morbidity.' The establishment of an individual health record draws the attention of the industrial physician to both of these groups. Further, health conditions in various departments of the plant may be compared and, finally, the overall problem of sick absenteeism may be intelligently studied."

The Pre-employment Examination

DR. FRANK A. BARLOW, Medical Director, Wright Aeronautical Corporation," Proper Placement of Women in Industry," in *J.A.M.A.*, March 11 (124:11, 687-691); discussion by DR. W. A. SAWYER, JENNIE MOHR, and DR. GEORGE MORRIS PIERSOL. Extract: "As industrial physicians we want to give the employee as thorough an examination as possible both for her own sake and for the sake of her fellow employees but still have it pleasant and free from any embarrassment. We want her to realize that the examination is for her benefit as well as for the particular industry she is to enter. These factors sometimes play such a part as to influence and make it difficult to interpret properly the resulting examination. This particularly is true for the average industrial physician who himself is a newcomer to an entirely different field. Women, as a rule, are usually less nervous when they know they are going to be examined by a woman physician. Thus, a woman physician can do a more thorough examination, particularly as regards hernias, pregnancy, cystoceles and rectoceles, without embarrassment on the part of the woman applicant. A complete pelvic examination is not done at any of our pre-employment examinations. If a thorough examination is necessary and essential from preliminary work-up, she is referred to her family physician for this pelvic check-up. The physical examination, to be of any benefit, should be as thorough as possible and should include a brief personal history. The examiner must know the type of work to be performed by the employee. One should observe the general appearance of the applicant, check for varicose veins, note all deformities, examine for hernias, both femoral and inguinal, and note the condition of the applicant's spine, skin, kidneys, blood pressure and vision. X-ray examinations, a Wassermann test and urinalysis should be included."

Obstetric and Gynecological

DR. H. CLOSE HESSELTINE, Chicago, "Specific Problems of Women in Industry," in *J.A.M.A.*, March 11 (124:11, 692-697); discussion by DR. GOODRICH C. SCHAUFFLER, DR. GEORGE W. KOSMAK, and DR. J. C. LITZENBERG. Author's summary: "Women can work efficiently in many industries but, because of physiologic behavior peculiar to them, attention to their peculiarities should reduce the amount of absenteeism and also protect the obstetric and gynecologic health of the individual. The cause of amenorrhea (gravid and menopausal causes excluded) should be adequately investigated. Menorrhagia should be looked on as a serious sign until such condition as cancer, other neoplasms and other conditions have been eliminated. Primary dysmenorrhea may require special study. Secondary dysmenorrhea is associated with many conditions and thus its successful therapy will depend on correction of the underlying factors. The menopause may be associated with emotional

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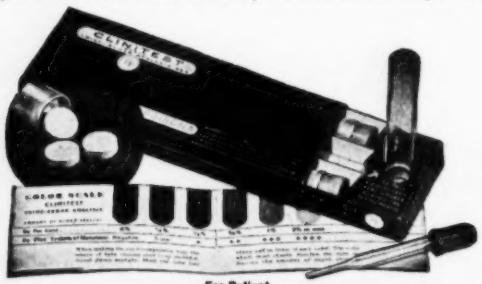

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instability. Pregnancy will require special consideration. Menstrual abnormalities, the menopause and pregnancy are non-industrial conditions. These conditions are classified as personal conditions, and thus obstetric and gynecologic care should be administered by the employee's personal physician. Private physicians should acquaint themselves about industrial problems in relation to obstetric and gynecologic conditions in order that they may collaborate with industrial physicians in common problems. Until factual and sufficient data can be procured and published on pregnant states, menopausal symptoms and menstrual abnormalities in relation to employment, directions and recommendations on employment, placement, safeguards, reduction of absenteeism and introduction of health measures will be guided by ideas and opinions. Some agency, private or governmental, should support studies to supply this urgently needed information. Fair and unbiased observers, committee or commission, could compile and analyze the data. From such a basis the employees would benefit by the gains for their welfare, and the employer should benefit by a reduction of absenteeism. The industrial physician would be aided by specific findings, and the private physician could prescribe more reliably for his employed patients."

Synthetic Rubber Hazards

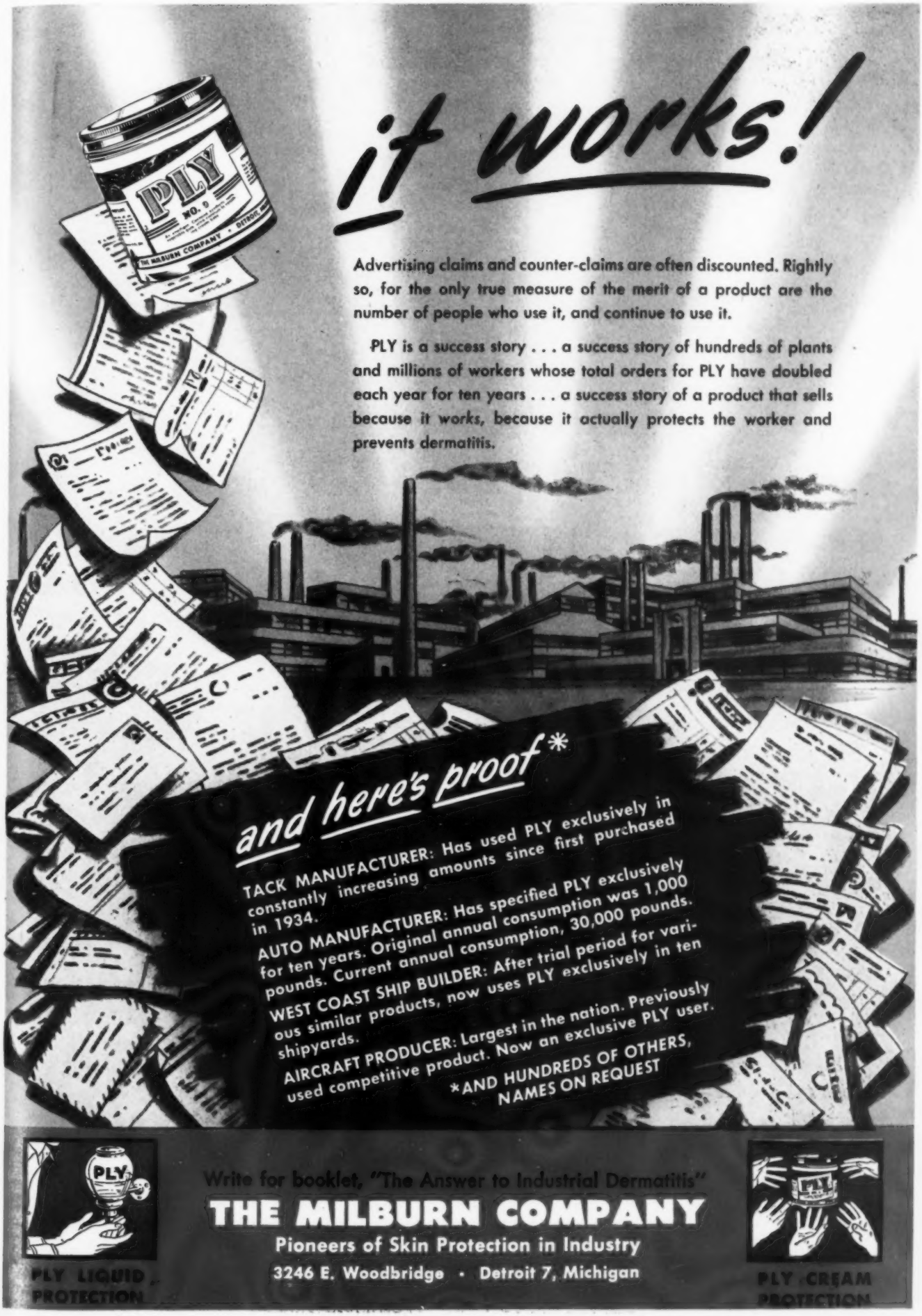
CAPTAIN REX H. WILSON, M. C., A.U.S., Fort Hayes, Ohio, "Health Hazards Encountered in the Manufacture of Synthetic Rubber," in *J.A.M.A.*, March 11 (124:11, 701-703). Author's summary: "(1) Butadiene is a light narcotic poison with no apparent danger to light exposures. (2) Styrene is to be considered as a toxic compound. Mild exposures to it do not produce pathologic effects. Heavy exposures may cause permanent damage, but so far this has not occurred. (3) Acrylonitrile is extremely toxic both from vapor toxicity and from toxic absorption. Even mild exposures are dangerous. (4) Other compounds used in the manufacture of synthetic rubber are to be considered to be toxic and precautions taken in their handling. (5) Treatment of exposed cases is chiefly symptomatic. (6) All operating personnel should receive thorough pre-employment examination and a complete periodic check-up every three months. (7) Adequate ventilation is to be supplied at all times. (8) Constant inspection of all equipment should be maintained. (9) Personal and group safety equipment should be supplied and its use enforced."

"Sickness" and Work

DR. JOHN E. FARRELL, Providence, "The Rhode Island Cash Sickness Compensation Act," in *J. Indiana State M. A.*, March (37:3, 143-146). Presented at the Secretaries' Conference of the Indiana State Medical Association, January, 1944. Extract: "The major issue for the doctors is the broad definition of 'sickness' which is given in the Act as follows: 'An individual shall be deemed to be sick in any week in which, because of his physical or mental condition, he is unable to perform any services for wages.' From this definition it is apparent that the private physician must not only certify to his patient's illness, but he must also assume the responsibility of certifying as to the ability or inability of the patient to do *any* work whatever for wages. The resulting situation for the doctor poses a conflict between conscientious duty to the law of the state, on the one hand, and on the other hand consideration of the successful continuance of his professional work, which depends in no small measure on public good will, with the cash benefits the taxed patient seeks as the weight in the balance. The dilemma may be solved somewhat this year if the proposal of the board is accepted by the legislature that the definition of sickness be further amended to provide that a person must be *'wholly* incapable of performing services of any kind or nature for wages.'"

Mental Aspects of Employment

DR. K. E. MARKUSON, Director, Bureau of Industrial Hygiene, Michigan Department of Health, "Mental Hygiene and Industry," in *Mental Hygiene*, January, 1944 (28: 1, 28-36). In a Symposium on Industrial Mental Hygiene, Toledo, December, 1942. Extract: "Just how far the medical department should go in the matter of mental examina-



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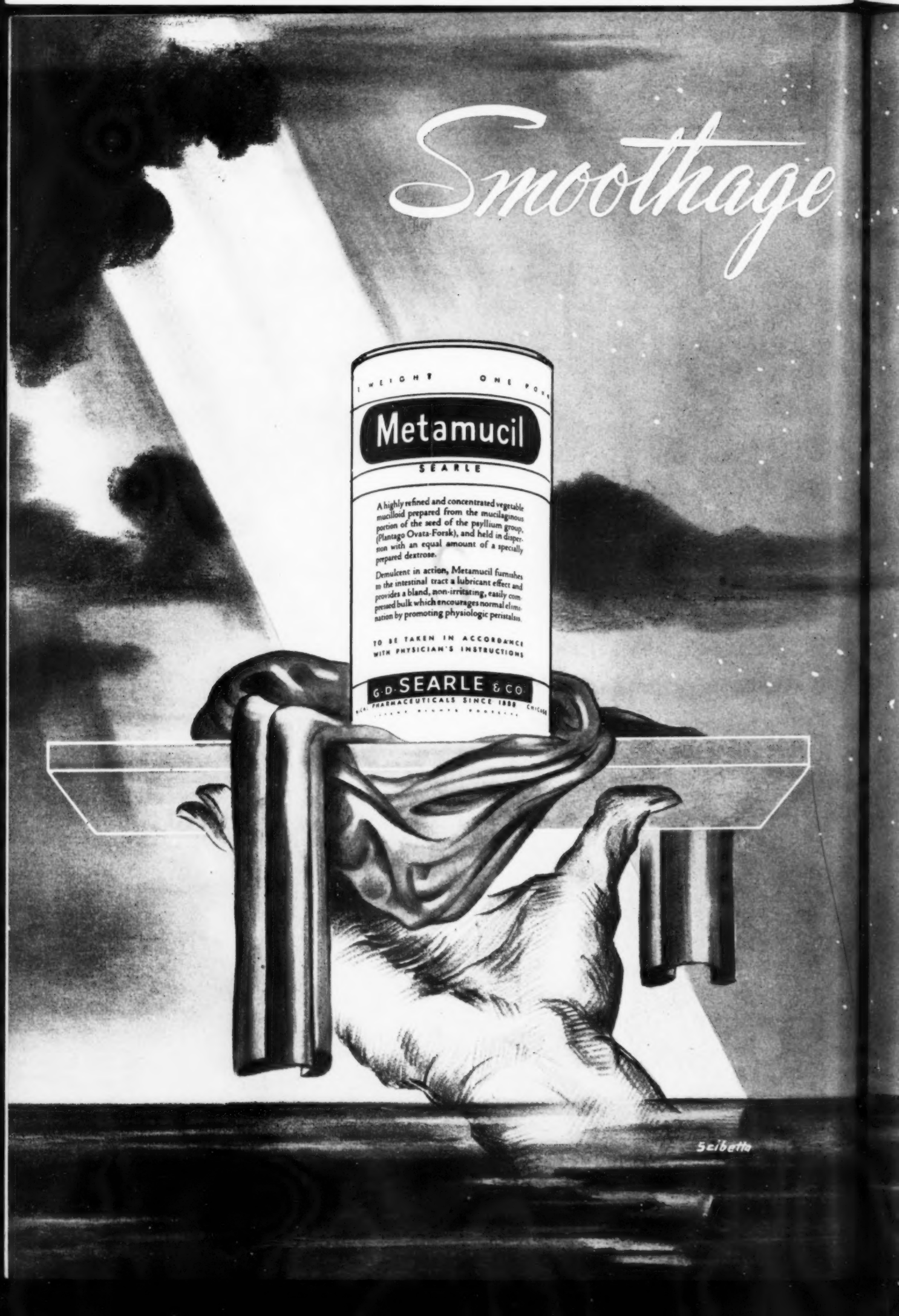
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RESEARCH IN THE SERVICE OF MEDICINE

tions, I am not prepared to say. It is my opinion that this phase of the placement program is quite specialized and should, therefore, be handled by those with special training. However, the medical department should be familiar with the procedures and able to recognize those individuals who should be referred to the specialist for individual tests."

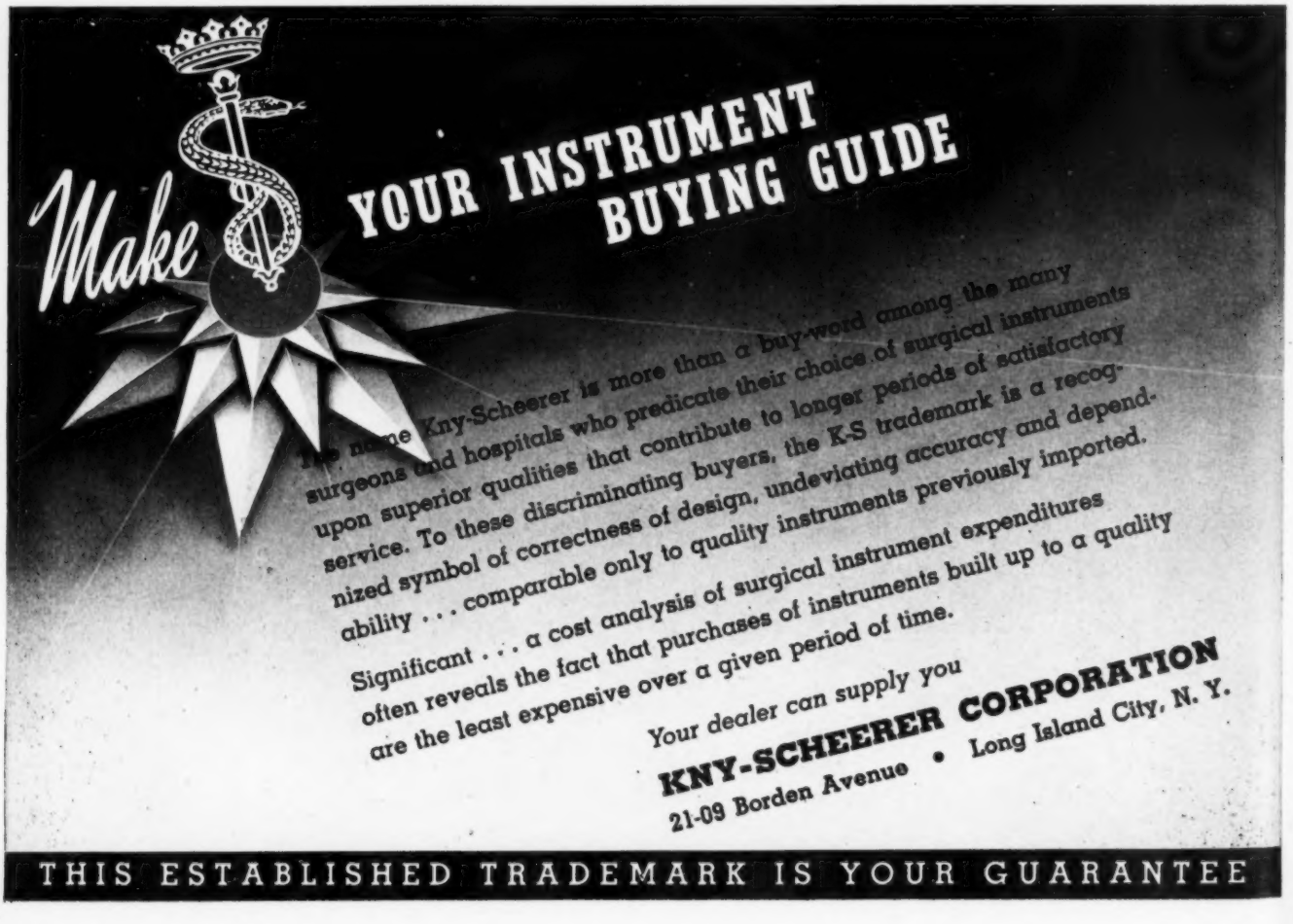
DR. A. L. BROOKS, Medical Director, Fisher Body Division, General Motors, "Mental Hygiene and the Industrial Physician," in *Mental Hygiene*, January, 1944 (28:1, 37-40). Discussion of DR. MARKUSON'S paper (above). Extract: "After the interview, the prospective employee goes to the doctor. Too often the latter takes the measure of the man's mental assets, but assumes no responsibility in regard to them. He feels that he is expected to examine the man only from the point of view of physical qualifications and that, having done this, he has fulfilled his duty. Only occasionally does he pick up an outstanding case, like the man who presented himself to us wearing a complete suit of metal armor in lieu of the conventional underwear, in order, he said, to 'make him a safe worker.' Dr. Markuson recognizes the need of close contact between employees and supervision. I have never seen such loyal cooperation as I did at a plant that I visited recently in which only about 300 men were employed, and the owner and manager was in continual contact with his men. We believe that 50 men per foreman—or better yet, 25—would be ideal. As to the relations of the medical department with employees, we have always insisted that we have nothing to do with matters of compensation or employee relations except in a way that would demonstrate our unprejudiced point of view. We want the employees to feel that we are employees, too, not 'The Company,' and that we are impartial in our treatment of them, so that they may rely on us for guidance as well as medical treatment. Proper understanding of the mental and emotional processes of employees, their proper placement and guidance, demands a knowledge that can best be obtained by careful study both of normal and of pathological reactions, followed by a considerable amount of practical experience in the field. The knowledge of handling industrial employees, like the practice of medicine, is both an art and a science."

Dermatitis as Injury

DR. LOUIS BABALIAN, "Occupational Diseases of the Skin in Maine," in *J. Maine Med. A.*, March, 1944 (35:3, 41-46). Read before the Portland Medical Club, November, 1943. Extract: "In Maine, labor injuries are compensated whereas occupational dermatitis cases are not. And that is logical, if it is true that they are the result of a special constitution of the patient. In other states, such as New York and Massachusetts, occupational dermatitis are compensated on the same basis as labor injuries.* I have no intention of taking sides in this discussion. All I can say is that in Maine, as in other states which oppose occupational dermatitis and labor injuries, the examiner role is difficult. (*Speaking of which, I think it is interesting to note the methods employed in Germany, which was the first country to compensate occupational dermatitis as labor injury. This measure sounds very favorable to the worker, but actually it works a hardship on him. For instance, if a worker is found to be allergic to dyes, he is compensated, but automatically excluded from a whole series of jobs such as dyer, furrier, hatter, shoe maker, hairdresser, chemist, druggist, photographer, maker of artificial flowers, etc., etc., and even rubber maker when the rubber is reduced by using aniline. In all these occupations he could be in contact with products chemically related with aniline.)"

Eyes

DR. E. EUGENE HOLT, JR., "Eye Problems in Industry," in *J. Maine Med. A.*, March (35:3, 47-49). Presented before the Portland Medical Society, November, 1943. Extract: "The value of ophthalmology to any industrial program is so essential that a large number of the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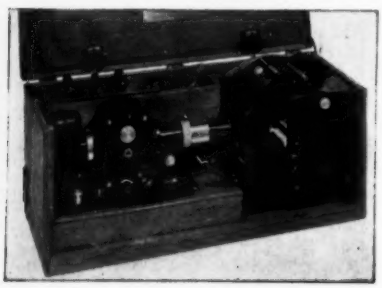

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New Skin Irritants

DR. LOUIS SCHWARTZ, Medical Director, Dermatoses Section, U. S. Public Health Service, "New Developments in Industrial Dermatoses," in *Pennsylvania Med. J.*, March, 1944 (47:6, 559-561). Read before the General Assembly of the Medical Society of the State of Pennsylvania, Philadelphia, October, 1943. Extract: "New industrial skin irritants have been discovered. Among these may be mentioned (1) the rubber antioxidant monobenzyl ether of hydroquinone, which can cause leukoderma by inhibiting the specific cell oxidase-propigment reaction before melanin is formed, (2) the photosensitizing action of bromfluorescin, a dye used in indelible lipstick, (3) the synthetic resins and the plasticizers used in nail polish and in wrist watch straps, which can cause sensitization dermatitis, (4) the new fabric finishes for making fabrics waterproof, flameproof, and mildewproof, which constitute serious dermatitis hazards to the users of the fabrics. As a result of this progress in occupational and related contact dermatoses, 28 states now have coverage for them under their compensation laws, medical schools have inaugurated undergraduate and post-graduate courses on occupational dermatoses, and dermatologists are now recognizing that occupational dermatoses are a specialty in dermatology. If progress continues at the same rate, it is possible that the causes of many eczemas will be found to be sensitivity to environmental substances, and the cure will consist not in avoiding such substances but rather in gradually and judiciously exposing the patient to them and having him build up his own immunity."

Medical Job-Analysis

DR. FRANK H. KRUSEN, Section on Physical Medicine, Mayo Clinic, "Wartime Physical Reconstruction," in *Military Surgeon*, March, 1944. Read at the Philadelphia meeting of the Association of Military Surgeons, October, 1943: Extract: *Step 8. Selective placement boards*—It should be the duty of the selective placement board, consisting of industrial physicians, psychiatrists, placement agents and industrial employment experts, to place each rehabilitated worker in a suitable industrial activity commensurate with his limited physical capabilities. Recently I attended a meeting of the Joint Committee on Rehabilitation of the Councils on Physical Therapy and Industrial Health of the American Medical Association. At this meeting, Dr. Clarence Selby, Medical Consultant of the General Motors Corporation, and Chairman of the Subcommittee on Industrial Health and Medicine of the Federal Security Agency, pointed out that industry cannot well do any physical rehabilitation except "on the job" He believed that selective placement is the key to successful industrial rehabilitation. He thought that industry will need the guidance of psychiatrists in developing this project. At this same meeting, Dr. John Coulter, Chairman of the Council on Physical Therapy of the American Medical Association, expressed the opinion that the entire subject of rehabilitation is primarily a medical problem. He thought that the rehabilitation program could be divided roughly into four parts: first, good surgery; second,

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Antiseptics and Their Action, R. M. Freeman: *Industrial Medicine*, February, 1940.

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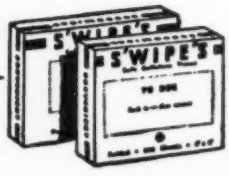

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satisfactory physical and occupational therapy; third, vocational training, and fourth, selective placement in industry. This joint committee sent a resolution to the Board of Trustees of the American Medical Association stating: "Private and industrial medical practice will become increasingly concerned with problems of reconstructive medicine and surgery and the rehabilitation of casualties of war and of war production. This Committee is of the opinion: (1) that the American Medical Association should emphasize strongly that rehabilitation is primarily a medical function, (2) that the medical profession be widely informed of legislative proposals in this field, and (3) that efforts be made to insure proper participation by the medical profession in all rehabilitation plans now being formulated.' *Step 9. Industrial rehabilitation*—Finally, in order to complete the adjustment of the disabled person to his life work, it is essential that industrial medicine rise to new heights in the care of this special class of workers. Industrial physicians, assisted by industrial managers, industrial psychologists, medical job analysts, and industrial social workers, will need to devote themselves to the problems of final adjustment of these war disabled persons so that they can continue normal activities and remain healthy without being pampered. This is a stupendous problem which will tax our organizational abilities to the limit."

Marihuana

DR. JOHN H. FOULGER, Director, Haskell Laboratory of Industrial Toxicology, "The Marihuana Problem," in *Delaware State M. J.*, February (16:2, 24-28). Extract: "In spite of legislation to the contrary, marihuana is still apparently sold. The potential purchasers and users now include thousands of young men who are living an unusual life, isolated from the contacts and controls of the family. So that they may be able to fight efficiently and to defend themselves while fighting, they must be maintained in an optimum state of health at all times, both during the training period and during their life as combatant troops at the front. Every available moment of their training period must be devoted to instruction in the use of their weapons and the art of self-defense. Time lost during this training period because of unnecessary sickness or inefficiency reduces their value as fighting troops and their ability to protect themselves. It must not be forgotten that adequate training for warfare demands that there be developed in these men a 'killer' instinct which, being contrary to their American tradition and upbringing, must necessarily in some cases lead to mental conflict. Finally, their health, and public health in general, requires proper control of all situations which might lead to the spread of venereal disease."

The New Need

DR. D. C. JARVIS, Barre, Vermont, "Maintenance of the Efficiency of the Business Executive in the Practice of Rural Medicine," in *Medical World*, March (62:3, 109). Extract: "If we, as medical men, wish to have an active practice all our professional days then we must, of necessity, shift our medical thought to meet the needs of the generation that is on the way up. To think medically in terms of the needs of only one generation is to be lost medically. The medical need of the generation which has just completed its life work was to control the infectious diseases and the epidemics. Out of this need came the discovery of the micro-organism which resulted in medicine becoming scientific. The need of the generation which those of us who are now older represent was a better knowledge of nutrition. Out of this need came the vitamins. The need of the present generation is how to carry the ever increasing environmental load and match the new tempo of life so they may live this life with some profit and pleasure to themselves. Out of this need comes a knowledge of the influence of environmental factors such as weather, food and emotional episodes on the physiology and biochemistry of the body and how to adjust body physiology and biochemistry when the need arises. This new type of medicine recognizes the place the autonomic nervous system occupies in our present day existence and how to employ suitable measures that will harness the sympathetic division of the autonomic nervous system and keep it under control."

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TEN YEARS AGO in "INDUSTRIAL MEDICINE"

DR. BRISTOL has rightly emphasized the necessity for the preventive point of view. However, it is quite impossible to separate what we know about preventive medicine from what we know about curative medicine; we learn preventive methods largely through the so-called "trial and error" method. What we know about preventive medicine, for example, was largely gained through repeated and collected experiences concerning disease manifestations, and the ways in which diseases have been contracted. This principle no less applies to the prevention and control of occupational diseases, and it is, therefore, necessary that preventive methods regarding occupational disease be developed through continuous observation and study of the avenues through which abnormal physical states develop; in other words, disease can be interpreted as the point of least resistance, and we may expect to reach industry's consciousness through the economic point of view when diseases give trouble. One might well say that when the patient is sick, that is the best time to start prevention. Similarly, when industry is having trouble with various diseases, the best time to talk about preventing them is at that time.

Mention was also made by DR. BRISTOL of the common diseases of the respiratory system, the circulatory, and nervous systems, the digestive system, and also the so-called degenerative diseases. A great deal of our present difficulty has arisen because of the necessity of distinguishing between the typical industrial and non-industrial diseases, so that proper responsibility may be placed.

One wonders, therefore, whether industry is willing to assume or should take the responsibility for the prevention of diseases which are non-industrial.

Finally, suggestions were made for special courses to be given to various types of individuals except for the part-time practitioner now in industry. From available statistics we learn that there are at present about 50 part-time industrial practitioners to one full-time medical director. The use of special clinics and meetings in various types of medical specialties to keep practitioners up to date is well known. Such methods of post-graduate education for the practicing industrial physician would be of as great value as in the other specialties; would it not be feasible to make some such arrangement for the part-time industrial practitioner of today, who surely needs "brushing up" from time to time?

Clearly, the problem of the teaching of industrial hygiene involves not only the undergraduate teaching and the post-graduate teaching of persons who intend to specialize full time in this field, but also vitally concerns the provision of continuous post-graduate clinics and meetings for the use of the great body of industrial physicians who are now practicing in industry and the adaptation of methods properly modified and changed from time to time to meet the needs of this group.

—Editorial, "Teaching Industrial Medicine," (with special reference to DR. LEVERETT D. BRISTOL'S writings on the subject), in INDUSTRIAL MEDICINE, April, 1934.

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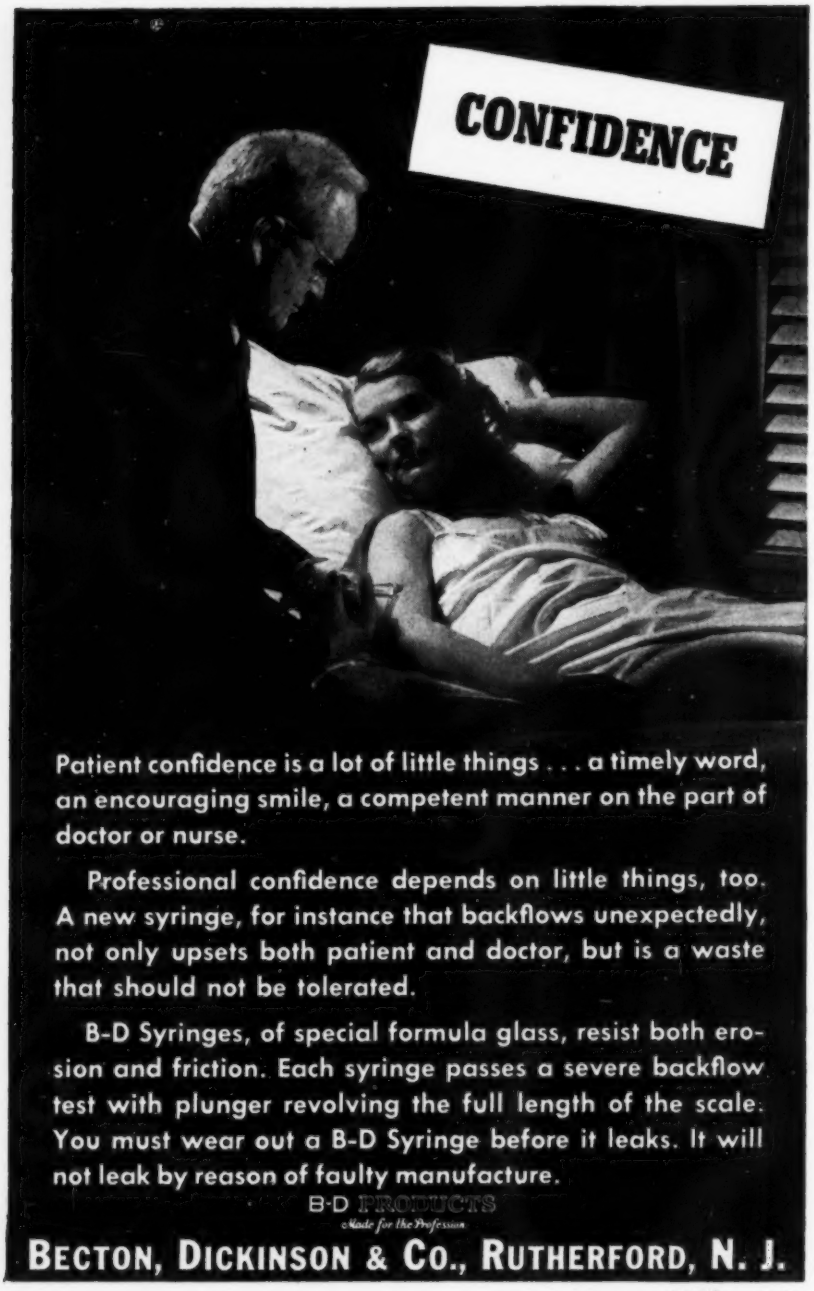
—DR. HART E. FISHER, in "The Medical Department Manual," in INDUSTRIAL MEDICINE, April, 1934.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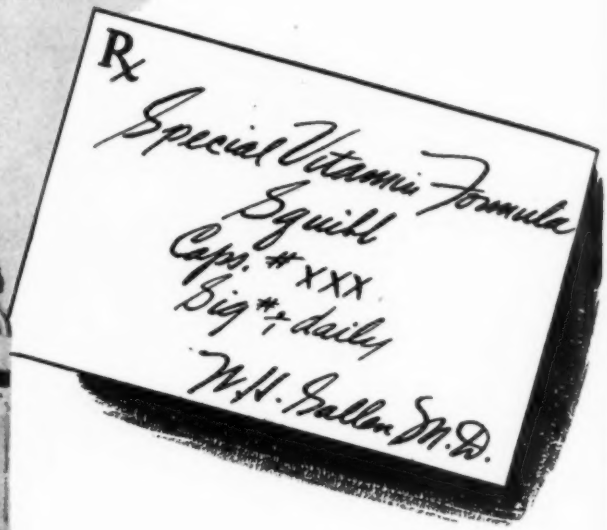

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[1] National Research Council, Reprint and Circular Series No. 115, Jan. 1943.

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Industrial Medicine

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The Journal of Industrial Health, Occupational Diseases and Traumatic Surgery

With which are consolidated "The Industrial Doctor" and "International Journal of Medicine and Surgery."

The Science, the Law and the Economics of Industrial Health

Volume 13 April, 1944 Number 4

The Differential Heart Sound Meter

—A New Method of Detecting Early Physiological Changes Due to Toxic Chemicals, Etc.—

JOHN H. FOULGER, M.D., and PAUL E. SMITH, JR.,
Haskell Laboratory of Industrial Toxicology,
E. I. du Pont de Nemours & Company,
Wilmington, Delaware

THE INDUSTRIAL physician cannot practice preventive medicine successfully unless he is given the means and the opportunity to detect early signs of physiological deterioration by frequent study of workers in his care. The means must be simple, applied easily and quickly, and not annoying to his subjects. Apparatus needed must be inexpensive, easily maintained, and used without great technical knowledge, and portable, so that in emergency it can be carried to any part of the manufacturing area.

Recently, one of us (J.H.F.) described in INDUSTRIAL MEDICINE[1] a system of periodic examinations of workers especially applicable to those exposed to industrial chemicals, which, in our experience, conformed to the above criteria. It was based upon standardized measurements of blood pressure and a statistical evaluation of the results. All complex mathematical factors were reduced to simple charts and tables so that in applying the method the physician required only a stethoscope, sphygmomanometer, watch, a knowledge of simple arithmetic, and the opportunity to examine his workers. Our claims for the usefulness of this blood pressure scoring method have been confirmed recently by PROBST,[2] and in personal communications by EVANS (Deepwater, New Jersey), NORWOOD (Kankakee, Illinois), WEAVER and COLL (Richmond, Virginia), SHERMAN (Buffalo, New York), GAIRDNER (Gibbstown, New Jersey), D'ALONZO (Wilmington, Delaware), KELLER (Louviers, Colorado), COULTER (Seneca, Illinois), STORMONT (Carl Junction, Missouri), SHOUN (Benson, Arizona), and MACKEY (Winnipeg, Canada), all of whom have had considerable experience in its use in plants manufacturing and using a wide variety of chemicals.

It is always wise to have available more than one method of examination, and, if possible, alternate procedures should be based upon somewhat different physiological factors. We describe below such a new method, which can be used in conjunction with the blood pressure scoring system and which is based upon a study of heart sounds.

Review of many thousands of blood pressure measurements made on workers exposed to industrial chemicals indicates that early in their history of exposure, there is often found a wide difference in one or both arms between diastolic pressures measured at the change of sound and disappearance of sound. A difference greater than 10 mm. was suggested in our previous publication as a warning of physiological change. A physical explanation of this phenomenon might be as follows:

The sound heard in the stethoscope during the measurement of blood pressure by the sphygmomanometer is a sound transmitted by the fluid blood in the arteries. It is usually rapidly damped by the elastic properties of the arterial walls and of the overlying skeletal muscle and other tissues. Should there be a reduction in tonus of the arterial muscle wall or the skeletal muscle, the efficiency of damping would be reduced and sounds which are normally below audible intensity would remain audible. The lower the muscle tonus the less the damping. Thus, on a purely physical basis, the spread between the two measurements of diastolic pressure might be an index of tonus and the extent to which it is affected by absorbed toxic chemicals or other factors.

If this hypothesis be correct, the early physiological action of chemicals might also be reflected in some manner in the action of the heart, for the heart responds quickly to changes in circulation which might jeopardize the body as a whole, as well as the heart's own blood supply. It is a matter of general experience that the electrocardiograph is not sufficiently sensitive for the detection of slight physiological changes in the action of heart muscle. It seemed to us that a study of heart sounds might be of value. The component frequencies, damping and energy of heart sounds must depend in some manner upon the response of those portions of the heart muscle involved in sound production to the physiological burden placed upon the heart. Because of its great resilience and reserve, we might expect the heart to be stimulated by conditions which depress systemic circulation, but to be depressed when such conditions, either by persistence or intensity of action threaten drastic interference with cardiac circulation. Considering the heart as an elastic structure, we would expect the heart sounds during the stimulation stage to contain components of higher frequency than are found in the normal state, and to exhibit more rapid damping of

some frequencies. Further, we might expect that the higher frequencies would contribute a greater proportion of the total energy of heart sounds than in the normal state. During the depression stage, we would expect the reverse to occur: lower frequencies, decreased damping, and more than normal energy in lower frequencies.

The manner in which these possibilities have been tested is described briefly in the following:

A. Changes in Damping of the First Heart Sound

IN STUDIES of experimental animals (dogs) and men, the heart sounds were picked up by a sensitive microphone and passed first through an audio-frequency analyzer, which selected bands of about 5 c.p.s. range, and then to a photographic recorder. At low frequencies, the sound record showed a series of oscillations, the amplitude of which described a more or less definite envelope. The higher the frequency of sound passing the analyzer, the more definite the envelope. A typical record of the first heart sound is shown diagrammatically in Fig. 1.

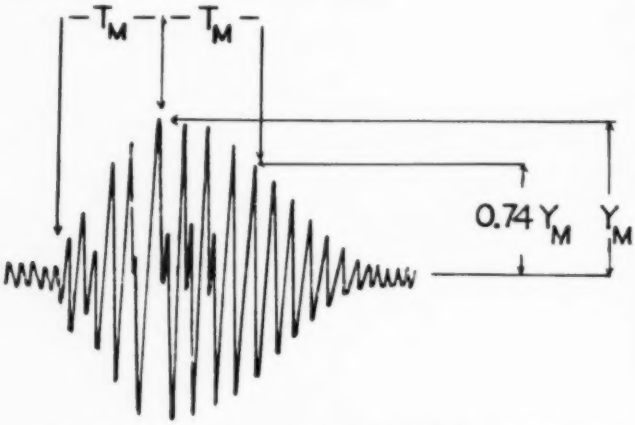

Fig. 1. Diagram of heart sound tracing illustrating envelope and measurements used to calculate damping of heart sounds

Mathematically, the envelope of such a record is most simply defined by the formula:

$$Y = Ate^{-bt}$$

in which Y is the amplitude at time
t from the beginning of the sound;
b is the coefficient of damping;
A is a constant.

When Y has a maximum value Y_m, it follows by differentiation of this formula that:

$$t_m = \frac{1}{b}$$

and $$Y_m = At_m e^{-1}$$

The value of $^1/_b$ can be measured on the photographic record as the time from commencement of the sound to the point of maximum amplitude of the envelope.

In practice, it is sometimes difficult to find the exact start of the sound on the record. From the formula above, it can be shown that when

$$t = 2t_m$$
$$Y = 0.74Y_m.$$

It is usually easy to find the maximum on the record, and, using a parallel ruler, find the point beyond this maximum at which the amplitude of the envelope is 0.74 of the amplitude at the maximum. The time interval between these two points is then

$$t_m = \frac{1}{b}$$

The value of t_m is independent of the actual value of the maximum and, therefore, independent of the position of the microphone on the chest of the subject. The shape of the envelope and the value of t_m are not due to properties of the muscle of the chest wall, for the same type of data can be obtained by direct application of the microphone to the exposed beating heart.

In studying the changes in damping of heart sounds in dogs exposed to chemicals, the best results were obtained when the analyzer passed sounds of 37.5 to 42.5 c.p.s., and we invariably based our measurements on the record of the first heart sound.

The procedure used was as follows:

During a preliminary control period we made as many sound records as possible, and the values of t_m were obtained using at least 10 separate first heart sound tracings on each strip of record. The mean and standard deviation of t_m were calculated for each animal on control data. During the experimental period, values of t_m lying at or beyond the mean plus or minus twice the standard deviation of the control data were considered abnormal. In experiments which did not involve either prolonged exposure to low or moderate concentrations of toxic materials or acute exposure to very active concentrations, the changes in t_m appeared in one direction only, downward, indicating an increase in the damping of heart sounds. In such cases, there is an expected 2.5% chance occurrence of values at or below the mean minus twice the standard deviation in a very large number of observations. After prolonged exposure to low or moderate concentrations of chemicals, or short exposures to highly active concentrations, t_m, having first fallen below the normal range, rises above normal, indicating reduction in damping. Again, there is a chance expectancy of 2.5% of a large number of observations lying at or above the mean plus twice the standard deviation. In following the trend of experiments, t_m values above and below normal range of the control period are considered separately.

Since in practice it is not possible to make a statistically large number of observations, the expected number of abnormal values occurring by chance alone was calculated for each group of readings by the binomial theorem:

$$E = 0.025\,N + 2\sqrt{0.025\,(1-0.025)N}.$$

We followed the trend of events by using the ratio

$$R\ (\text{abnormality ratio}) = \frac{\text{Observed No. Abn. Values } t_m}{\text{No. Abn. Expected by Chance}}$$

for each period of study.

Typical experimental results were as follows:

Experiment 1—Exposure to Vinyl Cyanide

TWO dogs, after a control period, were exposed for six hours each day on five days of each week to concentrations of vinyl cyanide varying from 18 to 26 p.p.m. Sound records were taken on Monday, Wednesday and Friday of each week, before and after the day's exposure. Measurements of t_m were made on each record and the values of R calculated for each week of exposure from the data of the control period, as described above. The results are shown in Table 1.

TABLE I.
EXPOSURE TO VINYL CYANIDE—DOGS

Period	Average Concentration p.p.m.	R
Acclimation to laboratory conditions	0	14.00
Control	0	0.00
1st week	26	0.80
2nd week	25	0.71
3rd week	25	1.43
4th week	19	2.86
5th week	0	0.00

When received in the laboratory, the dogs were in very poor condition and sound records for several days were abnormal. After several weeks in the laboratory on a standard diet, and with good treatment, the dogs settled down to a very stable control status.

During the exposure period, all abnormal values of t_m were equal to or below the mean minus twice the standard deviation, indicating that the concentrations of vinyl cyanide employed progressively increased damping of the heart sounds as exposure continued. During the fifth week of no exposure the sound records were normal.

Experiment 2—Acute Exposure to Nitrous Gases

NITROUS gases were produced by the action of sulfuric acid on sodium nitrite in an exposure chamber of 10 cu. m. capacity. Two dogs, Nos. 6 and 8, were exposed for five minutes to a concentration of 120 p.p.m. Sound records were taken before and immediately after exposure, and at intervals during the day.

To test the possible effect of oxygen inhalation on animals exposed to nitrous fumes, Dog No. 8 was given oxygen for about 2.5 hours, commencing 10 minutes after cessation of exposure to nitrous fumes. Table 2A shows the values of R calculated from the control data of each dog. In this table, R_a refers to t_m readings equal to or greater than the mean plus twice the standard deviation, and R_b refers to readings equal to or less than the mean minus twice the standard deviation for the controls.

TABLE 2A.
EXPOSURE TO NITROUS GASES—DOGS

		Dog No. 6		Dog No. 8	
Time	Treatment	R_a	R_b	R_a	R_b
9:30 A.M.	Control	0.00	0.00	0.00	0.00
10:00	5 min. exposure to 120 p.p.m. nitrous gases				
10:07		0.00	3.20	0.00	2.98
10:15				Commenced inhaling oxygen	
11:30		0.00	8.15	0.80	0.00
1:30 P.M.		0.00	6.43	0.22	0.00
1:45				Oxygen stopped	
4:00		0.00	6.40	0.71	0.00

TABLE 2B.
EXPOSURE TO NITROUS GASES—DOGS

		Dog No. 6		Dog No. 8	
Time	Treatment	R_a	R_b	R_a	R_b
9:30 A.M.	Control	0.00	0.00	1.00	4.00
10:00	5 min. exposure to 120 p.p.m nitrous gases				
10:07		0.00	1.60	0.00	8.15
10:15				Commenced inhaling oxygen	
11:30		0.00	8.15	1.60	0.80
1:30 P.M.		0.00	4.14	5.93	0.00
1:45				Oxygen stopped	
4:00		0.00	5.00	0.71	0.71

At 10:07 A.M., immediately after exposure ended, both dogs were markedly abnormal. Dog No. 6 was very abnormal by 11:30 A.M., and had not recovered as late as 4:05 P.M. Dog No. 8, given oxygen, improved rapidly.

When this experiment was carried out, there was insufficient general information on the normal limits of t_m for dogs. Later, a summary of control readings on a larger number of animals indicated that the usual limits (that is, mean plus or minus twice the standard deviation) of t_m for dogs are 33 and 50 units. One unit is 0.001 second. When recalculated on this general standard, the data of Table 2B are obtained. This shows that Dog No. 8 was in a much poorer condition at the start of the experiment than Dog No. 6, and became much more abnormal than No. 6 immediately after exposure to nitrous fumes. No. 6 became progressively worse and had not recovered significantly by 4:00 P.M., but Dog No. 8 had reached a condition in which R_a and R_b were both below 1.0, that is, a normal status.

It is interesting that Dog No. 8, under oxygen treatment, passed from a condition in which the abnormal values of t_m were low, indicating increased damping of heart sound, to a status in which the abnormal values were high, indicating depression of damping. We have noted this situation in other experiments in which oxygen is inhaled. It suggests that the heart did not need such great activity to maintain the supply of oxygen to the tissues.

This particular experiment is interesting because it confirms the opinion, gained from the blood pressure scoring studies, that exposure to toxic chemicals superimposed on an initial poor physiological condition can lead to rapid and pronounced deterioration.

These examples taken from a number of experiments using very different chemicals indicate that our procedure shows trends in physiological condition produced by the exposure to these chemicals and a return to normal on rest from exposure.

B. Changes in Periodicity, Components of First Sound

IN A NUMBER of our studies, we have made heart sound records routinely on a stethocardiograph for a purpose entirely different from the analysis of the sounds. Fortunately, the microphone and recording equipment gave tracings containing those frequency ranges in which we are most interested. Our experimental data, though rather scant, can be used to show a change in periodicity of some components of the first heart sound when animals are exposed to toxic chemicals and, therefore, presumably a change in elasticity of the structures of the heart producing that sound.

The procedure adopted for study consisted of measuring the periods corresponding to lower frequencies in the tracings of a number of first heart sounds, using at least 10 tracings. The easiest method of measurement was to select an interval extending from a peak of oscillation at the beginning of each sound tracing to a peak at the end of that tracing. The interval was measured with a vernier caliper in units of 0.1 mm. and the number of oscillations included in the interval counted. The length of the interval was then divided by the number of oscillations, and the result recorded as the average value of the period for the pulsation. This value could be expressed as frequency by using a factor for the rate of movement of the photographic record paper. A rate of 75 mm./second was found best for taking such records. As with data from the sound analyzer, we calculated the mean and standard deviation of the periodicities obtained during the control period on each animal, and used the 2.5% expectancy of deviations from the mean equal to or greater than twice the standard deviation in either direction in finding the abnormality index, R.

The results of this type of study are shown by experiments 3 and 4.

Experiment 3—The Feeding of T.N.T. to Dogs

DOGS A and B were given a bread and milk diet for some three weeks prior to a study of the effects of feeding T.N.T. The diet of Dog A was supplemented daily by 100 mg. of ascorbic acid and 1 mg. of thiamine chloride. During the control period, heart sound trac-

ings were taken. Later, varying doses of T.N.T. were given by mouth and, in addition to other measurements and procedures, heart sound records were made from time to time. The trend of R calculated from these records is shown in Table 3. All abnormal periodicities found in these dogs were below normal range, that is, frequencies were above normal.

TABLE 3.
TNT ORALLY—DOGS

Period	Diet and Treatment	Dog A R	Dog B R
Control	Bread and milk ad lib.	0.00	0.00
	Dog A—daily supplement of 100 mg. ascorbic acid and 1 mg. thiamine chloride		
1	After three daily doses 20 mg/kg. TNT	8.00	8.00
	Both dogs sick, refusing food		
2	At end of 11 days rest period	0.00	6.40
3	After nine doses 10 mg./kg. TNT	3.48	8.00

It is seen that both dogs were equally affected by the relatively high dose of 20 mg./kg. T.N.T. given for three days, but that Dog A on the diet supplemented with ascorbic acid and thiamine recovered during an 11-day rest period, whereas Dog B remained definitely abnormal. In both cases, nine doses of 10 mg./kg. T.N.T. given over a period of 11 days produced abnormality in the dogs, but Dog B, at the end of the experiment, was in a very much more abnormal state than Dog A.

Experiment 4—The Feeding of Digitalis

DOSES of 2 grains of dried, powdered digitalis leaves were given orally to a normal stock dog. Heart sound records were made before giving the drug and at intervals after. The control data and the trend of R obtained from measurements of periodicities of the first heart sound are given in Table 4.

TABLE 4.
DIGITALIS ORALLY—DOG

Date	Time	Treatment	R
10-20 to 10-22		Control	0.67
10-22	10:00 A.M.	Digitalis leaves 2 grains	
	11:50		0.00
	1:45 P.M.		1.60
	2:00	Digitalis leaves 2 grains	
	3:00		4.00
	4:15		3.20
10-23	9:45 A.M.		0.80
11-4	9:30 A.M.		0.00

It is apparent that exposure to chemicals produces very definite changes in heart sounds, which can be measured both in terms of damping and in terms of changes in component periodicities of the first sound. Both the measurement of damping and that of periodicity suffer from drawbacks, and do not conform to the criteria set up for examination procedures applicable to preventive medicine in industry.

The equipment needed to measure changes in damping of sounds is costly and the technic tedious. Further, it is not quite clear how far the form of the envelope of photographic sound tracings, and, therefore, the mathematical analysis, is influenced by intrinsic damping characteristics of the analyzer.

The measurement of periodicity suffers from the practical drawback that the equipment used is expensive, although not so expensive as that required for measuring damping, and the technic tedious. Further, since the characteristics which make apparatus amenable for the ordinary clinical use of heart sound records are not necessarily adequate for this particular type of sound analysis, it is not easy at the present time to obtain suitable equipment. The measurement of periodicity is no more difficult than the measurement of electrocardiograms, but it is more difficult and less reliable than the measurement of t_m in the calculation of changes in damping.

C. The Distribution of Energy in Heart Sounds

SINCE neither of our first two methods satisfies the practical requirements of industrial preventive medicine, we thought it possible to construct a simple, relatively inexpensive apparatus, which would indicate changes in the distribution of energy which must result from the frequency shift produced in heart sounds by exposure to chemicals, improper nutrition or fatigue. After much experimentation, we have built an instrument which comprises:

(a) A microphone of such characteristics that it will pick up the lower frequencies composing the heart sounds.

(b) A two-stage audio-frequency analyzer.

(c) Two channels, one of which passes all energy coming from b, and the other, only that energy contained in frequencies above the upper level of a suitable high pass filter.

(d) A means of balancing these two channels and reading the percentage of total energy which passes the filter.

A detailed description of this apparatus will be published later.

To use this instrument, the microphone is placed over the heart in the same manner as a stethoscope, although, since it is much more sensitive than the stethoscope, care must be taken that it does not shift or press so closely to the chest wall as to produce extraneous sounds. The needle of the galvanometer or ammeter used to indicate the energy coming from the two channels pulsates at each heart sound. The swing of the meter needle can be brought to a point of balance by a simple adjustment of the tuning device, and the dial of the tuning device is calibrated to read directly the energy passing the filter as percentage of all energy in the heart sound picked up by the microphone.

By using a suitable series of filters, it is possible to follow trends in sound energy in humans and dogs, and also in such small laboratory animals as guinea pigs and rats. For the first time, therefore, an opportunity occurs for the study of changes in efficiency of the circulatory apparatus of small, intact laboratory animals. Results of typical applications of this instrument are given below.

Experiment 5—Development of Scurvy in Guinea Pigs

SIX GUINEA PIGS were used, all on a standard complete diet. After a suitable control period, three were deprived, as far as possible, of all sources of vitamin C. Readings of the distribution of energy in the heart sounds were made each morning and afternoon on five days of each week. At the end of the experiment, all heart sound energy readings on the control animals and on the test animals during control period were analyzed statistically as a basis for the calculation of the abnormality index, R. The results of this study are shown in Table 5.

The guinea pigs deprived of vitamin C showed the expected weight trend and eventually died from scurvy,

confirmed by gross and microscopic pathologic studies. Since, in the instrument used, a rise in the percentage of energy passing the filter indicates the presence of higher frequencies, that is, stimulation, and a fall indicates a change to lower frequencies, that is, depression, the table gives the values of R according to whether the abnormal readings were below (R_b) or above (R_a) the control limits.

TABLE 5.
VITAMIN C DEPRIVATION—GUINEA PIGS

Week	R_a	R_b
Control	0.00	0.00
1	0.00	0.43
2	0.00	0.82
3	0.00	0.00
4	4.08	0.41
5	0.59	4.71

Until the fourth week, there was no significant change in the status of the animals, both R_a and R_b remaining below 1.0. When the change did occur, it was first in the direction of an energy increase in higher frequencies. During the fifth week, when the animals were definitely scorbutic and moribund, the change was definitely in the direction of increased energies in low frequencies, that is, depression. Definite abnormality in the distribution of sound energy appeared when the weights of the vitamin-deficient animals had fallen to between 68 and 85% of their peak weights.

Experiment 6—Exposure to Carbon Monoxide

A STOCK DOG, on which we had some control readings of energy distribution of heart sounds, was exposed to illuminating gas, with a carbon monoxide concentration of about 0.03% for some 4.5 hours. At the end of exposure and for several hours following, heart sound readings were made, and through the experiment the carbon monoxide hemoglobin content of the blood was estimated by the pyrogallol-tannic acid method. Results are shown in Table 6, and Fig. 2. In this table the actual readings of the heart sound meter are given.

TABLE 6.
ACUTE EXPOSURE TO CO—DOG

Hours		Dial Reading	Blood CO-Hb %	CO in Air %
0 (Control)		48 to 56	0	0.000
1.2	Exposure to Illuminating Gas	61	28	0.033
2.2		66	33	0.030
4.6		79	35	0.027
5.8		77	35	0.034
6.8	No Exposure	74	30	0.000
7.9		70	30	0.000
23.8		58	0	0.000

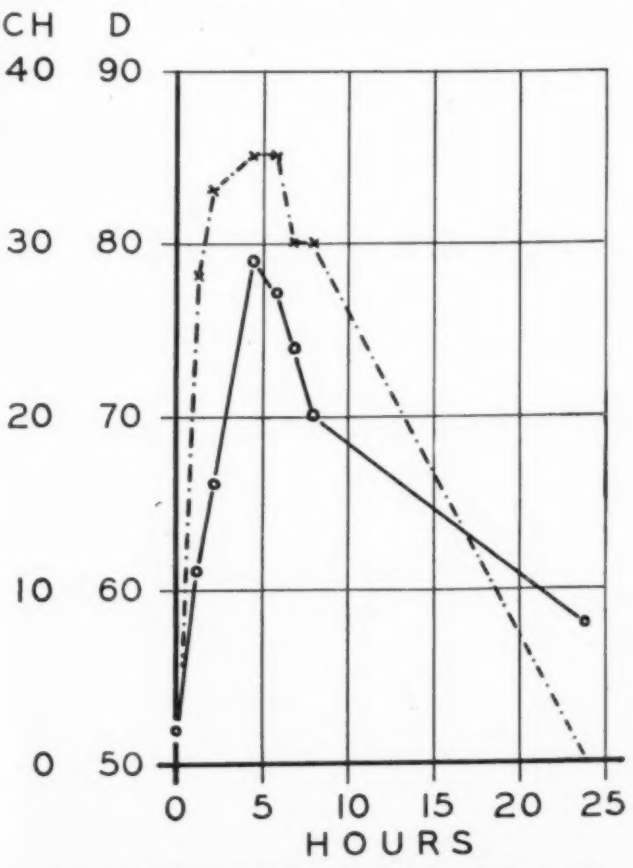

Fig. 2. Full line—trend of dial reading (D) of differential sound meter during and following recovery of a dog from exposure to carbon monoxide. Dotted line—trend of carbon monoxide hemoglobin content of blood (CH)

Studies on Human Subjects

THE ultimate aim of this study is to establish a procedure which can be used on human subjects to detect slight changes in cardiovascular reaction produced by exposures to adverse conditions whether they be toxic chemicals, or fatigue or malaise due to malnutrition, lack of rest or other non-industrial factors.

In the initial testing of our heart sound meter, we made readings as often as possible on three of the laboratory personnel in the morning soon after coming to work, and at the end of the day's work. Initial readings were made sitting after at least five minutes' rest. The subjects were then given the standard two-step test described by Master.[3] This test occupied 1.5 minutes. Immediately after the exercise, they sat again, and sound energy readings were taken at 0.5, 1.0, 1.5, 2.0, 4.0, 6.0 and 8.0 minutes.

The results of our initial 37 tests suggested four distinct types of response to exercise. These are shown diagrammatically in Fig. 3, numbered 1 to 4. The characteristics of the types are as follows:

Type 1: This appears to be a normal trend. There is an increase in the sound energy passing the filter immediately after exercise, reaching a peak in about 0.5 minutes, and returning rapidly to the control level within 1.0 to 1.5 minutes.

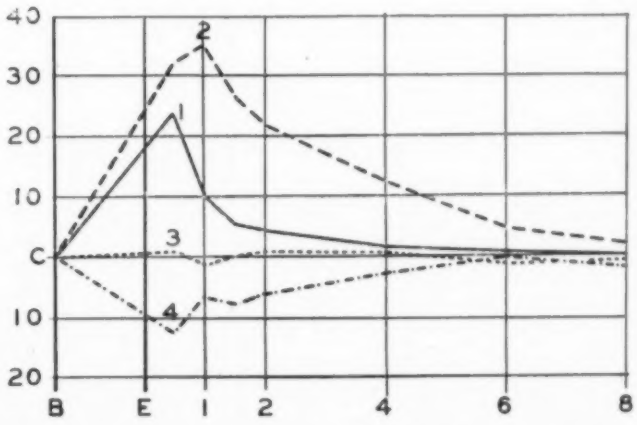

Fig. 3. Diagram of general types (1 to 4) of trend of heart sound energy in response to the Master two-step test. B and E mark beginning and end of exercise. Base line reads minutes. Vertical axis shows difference of dial reading from resting value, C

Type 2: Exercise causes a marked shift of energy to higher frequencies; often the shift is greater than in Type 1. Recovery is much slower, requiring some six minutes to return to within 10% of control.

Type 3: Exercise causes little shift in energy distribution from that shown in the original sitting reading.

Type 4: The dial reading tends to fall immediately after exercise, but may return to within 10% of the sitting reading within one minute after which there may be little change. Sometimes, however, the return to the control reading is slower.

While these are general types, increased experience has shown that many intermediate forms of response may occur. Experience has also shown that during recovery from a Type 3 or 4 reaction produced by chemicals or by other factors, the subject returns to normal via Type 2.

In our 37 initial tests made on the three laboratory personnel, the distribution among types was as follows:

Type 1—16; 2—3; 3—12; 4—6.

At the time of making the test, each subject answered a questionnaire as to conditions which might be expected to affect the results. The answers obtained were as follows:

		No. of Tests
Type 1.	No comment	16
Type 2.	A cold with slight fever	1
	Test made 1 hour and 40 minutes after blood donation	1
	No comment	1
Type 3.	Sound sleep, but of very short duration	4
	Exposure to a chemical immediately before the test	1
	Fatigue and anxiety following change of residence, and acquiring and shipping of furniture	3
	Sickness in the family	1
	No comment	3
Type 4.	Poor sleep, restless and nervous the previous night	2
	Unusual fatigue outside the laboratory, again involving moving residence, shipping furniture, etc.	2
	Sick wife or child without adequate attention at home	2

Increased experience with this procedure confirms our opinion that detectable changes in the distribution of energy in the heart sounds can be produced by any or all of those factors, acting alone or together, which we have found to influence the blood pressure score adversely. Moreover, this new method of studying physiological deterioration is much more sensitive than the blood pressure method, and in both animal and human experiments can be used to follow physiological trends over short periods of time, which are not detectable by any other means.

The diagrams in Fig. 4, (A, B_1, B_2, C_1 and C_2) are records from a supervisor, who, in the course of his daily work, is exposed to low concentrations of many different chemicals. They are selected from a large number of records to illustrate the trends of heart sound records in response to exercise at the beginning and end of a normal week's work.

While in many cases the standard exercise test produces an increase in pulse rate, and, under normal conditions this, to some extent, follows the increase in dial readings of the heart sound meter, the change in the distribution of energy in the heart sounds is not necessarily in the same direction as the change in pulse rate. In many cases, subjects have shown Type 3 and 4 reactions on the heart sound meter simultaneously with a great increase in pulse rate.

A particular instance of lack of correlation between pulse rate and the dial reading of our sound meter is the following:

One of our laboratory personnel, while giving Types 3 and 4 reactions in the step test, was subjected to the Burger test, which consists in breathing for 20 seconds against the resistance of a water column equivalent to a mercury column of 40 mm. in height. An electrocardiogram was taken while the heart meter readings were made.

Table 7 shows the trend of pulse rate and the dial readings on our sound meter.

We are not prepared, at the moment, to ascribe the trend in sound energy distribution to any particular function of circulation. Certainly it is not correlated with heart rate, nor directly with any one factor in arterial blood pressure. If it be due to changes in elastic properties of the heart muscle, it is probably a function of the load placed upon the muscle, which

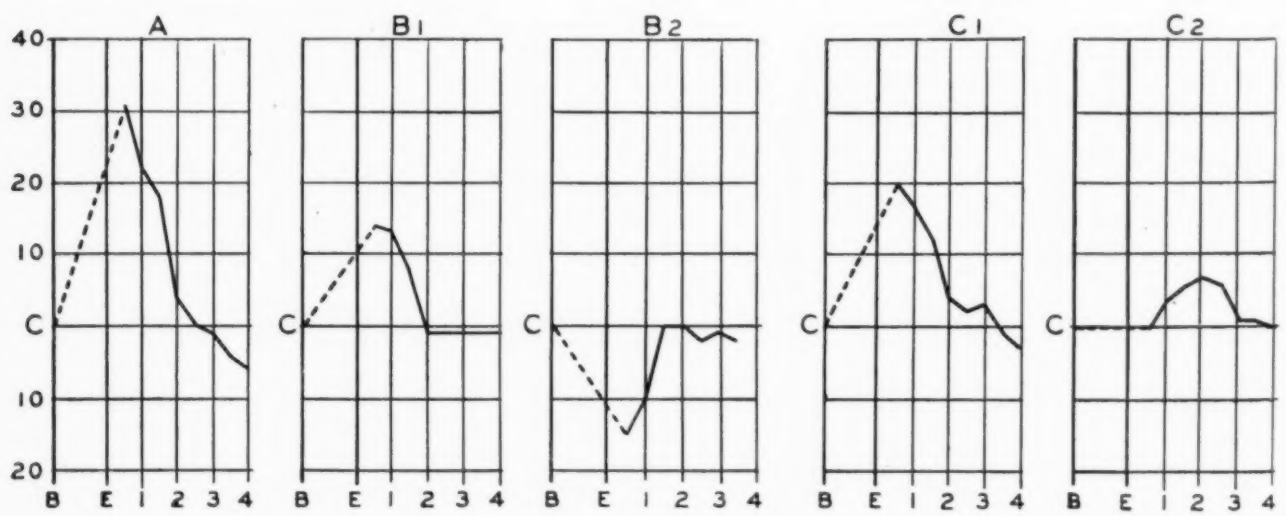

Fig. 4. Typical responses to exercise test, recorded in same manner as in Fig. 3
Record A: 7/19/43 (Monday) 10:30 A.M.—Subject has just returned from two weeks' vacation. Tracing normal for this subject.
Records B_1 and B_2: 10/18/43 (Monday) 10:20 A.M. and 10/22/43 (Friday) 3:20 P.M. — Trend is result of cumulative action of poor sleep and exposure to low concentrations of a number of chemicals.
Records C_1 and C_2: 12/27/43 (Monday) 9:00 A.M. and 12/31/43 (Friday) 4:20 P.M. — Result of week's work, plus development of upper respiratory infection

TABLE 7.

	Time Seconds	Pulse rate/ minute	Dial Reading
	0.0	80	..
	1.5	79	52
	5.0	76	54
	9.0	87	52
Burger	25.0	106-110	50
Test	32.0	94	..
	40.0	46	48
	55.0	50	61
	59.0	56	..
	70.0	..	56
	85.0	..	54

logically would point to its being a function of the volume of blood against which the ventricles contract. Since this volume must depend upon the venous pressure and the filling time of the ventricles, it seems possible that our new method of following physiological trends may be in some way an index of *venous pressure* in contrast to the blood pressure scoring system, which is based upon *arterial pressure*.

Photographic records of sound energy tests show an increase in the percentage of energy passing the filter of our apparatus on deep inspiration. According to Stroud,[4] "During inspiration the increased negative pressure in the thorax causes a greater emptying of the large veins with a fall in venous pressure. The contrary occurs during expiration." This would suggest that our dial readings indicate "emptying of the large veins," that is, minute filling volume of the right heart.

The situation can, perhaps, be clarified by studies of the Burger test, which is virtually a modified Valsalva experiment. We have obtained varying results in this test. The subject giving the result of Table 7 had frequently given a Type 3 sound energy reaction in the Master two-step test, and in the Burger test of Table 7 approached syncope. Later, when his exercise test was of Type 1, there was an immediate rise in the sound energy reading as he breathed against the water column.

Apparently the results obtained depend upon the degree of inflation of the lungs when the subject starts to breathe against the water column. If no particular effort is made to inspire immediately before expiring against pressure, there is little change in the sound energy level from the resting state. There is a somewhat greater, but still not significant, change if a moderately deep inspiration be made just before expiring against the water column. But if a deep inspiration is made first, the test is not only a much greater strain, but also leads to a marked rise in the sound meter reading.

Grollman[5] says that Krauss in 1904 "observed that after a maximal inspiration, expiratory efforts made while the glottis is kept closed result in an alarming diminution of the size of the heart with each heart beat. The heart practically empties itself and assumes a volume only a fraction of its normal size. Expiratory efforts during closure of the glottis result in a positive pressure in the thorax which drives the blood from the heart and prevents the inflow of the venous return. The heart, under these conditions, makes maximal efforts to empty itself." Breathing against a water column at the end of a deep inspiration is equivalent to breathing against a closed glottis. The "maximal efforts" of the heart to empty itself must involve increased tonus and, therefore, we would expect increased dial readings on our sound meter. But it should be noted also that as part of the result of expiration against pressure "the inflow of the venous return" is prevented, which implies that venous pressure in the large vessels must be increased. Fishberg[6] states, "When the intrathoracic pressure is elevated by forced expiration with closed glottis (Valsalva experiment), the venous pressure mounts to great heights. On the other hand, depression of the intrathoracic pressure by forced inspiration with closed glottis (Mueller experiment) results in a fall in venous pressure." Again, he[7] states, "Higher venous pressure entails greater diastolic filling of the right ventricle, and, according to Starling's law of the heart, a more powerful systole of the chambers."

In our laboratory experiments and clinical tests, those conditions which lead to the "depression" type of sound energy change are such as we associate with inability to maintain a normal return to the right side of the heart against gravity.

A crude form of Mueller test was carried out in which the subject, with nose closed by a clamp, made a maximal expiration and then tried to inhale through a closed test tube. At the same time, a stethograph attached to a water manometer indicated the increase in thoracic expansion (that is, decrease in intrathoracic pressure). As the subject tried in inhale through the closed tube the stethograph manometer and the sound meter reading both rose. At approximately the peak of the manometer reading, that is, at the point at which a forced inspiration really began, the sound meter reading commenced to fall and continued to fall in general until the end of the test. Since, as Fishberg states, "forced inspiration with closed glottis results in a fall in venous pressure," the change in our sound energy reading would appear to be in the same direction as that of venous pressure.

From these simple studies, it would seem that the direction of change of the energy readings obtained by our apparatus is, in general, the same as the direction of change of venous pressure and diastolic filling of the right heart.

The use of the differential sound meter in conjunction with Master's two-step test is very valuable in the study of both immediate and cumulative effects of exposure to chemicals and other adverse conditions of environment. In this use, emphasis is placed upon the trend of the distribution of sound energy immediately after the exercise rather than upon the absolute level of the dial readings at any time. In routine plant work, the trend of the resting (sitting) dial reading from week to week might be of value. Our apparatus is adjusted so that the usual resting reading for a normal subject, giving a normal exercise response, is about 50. Experience with animals (as illustrated by Experiments 5 and 6) shows that in the "stimulation" stage, the resting dial reading is higher, and that in the "depression" stage it is lower than usual.

We believe that this general shift occurs also with men. Thus, we have two criteria—resting dial reading and type of response to exercise—for assessment of the physiological status of workers. Definition of the "normal" range of sound energy distribution for human subjects must wait upon accumulation of more data.

At the present time, the difficulty of obtaining radio equipment makes it improbable that this instrument can be made in large quantities. However, it seems to us possible that in the future it could be made available at low expense for use in industry. In the meantime, we are trying to add to our information on its use in both industry and laboratory work.

Summary

THE early physiological effects of exposure to toxic chemicals can be detected by the study of:

(a) Changes in the damping of certain components of the first heart sound.

(b) Changes in the average frequency of components of the first heart sound.

(c) Changes in distribution of energy in heart sounds.

2. Exposure to concentrations of toxic chemicals of low physiological activity increases damping and average frequency of the first heart sound, and increases the proportion of energy in the higher frequencies of the sounds.

3. Prolonged action of concentrations of minimal activity, or acute action of higher concentrations of chemicals reduces damping and average frequency of the first sound, and decreases the proportion of energy in the higher frequencies.

4. The changes produced by absorption of toxic chemicals can be produced also by malnutrition, disease and fatigue, and the changes are greater if two or more of these factors operate simultaneously.

5. A newly devised apparatus for measurement of the distribution of energy in heart sounds can be used to study physiological changes in man as well as in dogs and small experimental animals such as rats and guinea pigs.

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Fixation of Fractures

—Analysis of External Techniques—

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CONSIDERATION should first be given to the fundamental principles of all fracture treatment as taught by Professor Boehler and generally accepted by the medical profession, namely:

1. In every fracture the displaced fragments of bone must be exactly reduced.

2. The reduced fragments must be fixed in good position uninterruptedly until they are joined together by bone.

3. During the necessary duration of fixation of the well-set fracture, as many as possible, or all, of the joints of the limb and of the whole body should be actively moved through the full range that can be done without pain, in order to prevent damage to the circulation, atrophy of the muscles and bones, and stiffness of the joints.

What Heals Broken Bones?

TIME; uninterrupted rest; and good circulation—produced by instituting active and passive exercises of the injured limb and the whole body.

Read at the Mid-Winter Scientific Session of the CENTRAL STATES SOCIETY OF INDUSTRIAL MEDICINE AND SURGERY, Friday, December 3, 1943, Chicago, and the Meeting of the Chicago Medical Society, Jackson Park Branch, Thursday, February 17, 1944, Chicago.

In attempting to fulfill, and more accurately carry out, the fundamental principles of fracture treatment, we are obtaining gratifying results with the technique of skeletal pinning and external fixation; and, at the same time, we have been able to simplify the care of the soft tissue and compound injuries, and have eliminated the use of foreign material such as is employed in internal fixation at the fracture site and so often results in infection, interference with the blood supply, and damage to the surrounding tissue.

This technique has proved to be invaluable in treatment of fractures of the extremities associated with skull fractures and internal injury. Dr. Urban E. Gebhard, of Milwaukee, recently emphasized the frequency of skull fractures associated with one or more fractures of the extremities. In these cases of associated injuries, where shock is already present (a factor that must always be taken into consideration in the treatment of fracture) the pins may be inserted in the proximal and distal fragments under local anesthetic in bed and, with gentle manual manipulation and traction, the fragments may be completely immobilized with a light duraluminum bar as external fixation.

Delirium, with uncoordinated body movement, creates additional trauma at the associated fracture sites, and this, in turn, aggravates the already present shock. In such cases, if the surgeon is hesitant about using even slight traction or manipulation, the fragments may at least be definitely immobilized, preventing any further trauma or injury during the early stages of management of skull fractures.

The method of caring for skull fractures which has so ably been outlined and systematized by Dr. Harry E. Mock, Sr., of St. Luke's Hospital, Chicago, has been our guide in the management of acute cranio-cerebral injuries. We quote from his article: "Do nothing or the least amount of handling or manipulation which may add insult to injury." The technique we use can be advantageously employed without disrupting Dr. Mock's type of treatment.

There is general agreement that skull fractures complicated by fractures of the extremities should not have any elaborate reduction of the fractured extremity, because of the trauma incident to the procedure which will aggravate the general condition and have a deleterious effect on the sequelae of the head injury. However, lack of adequate control of the fragments of the fractured bone in themselves is productive of considerable shock and an important factor in "worsening" the general condition of the patient. For this reason we feel that insertion of pins under local anesthesia at the bedside, thus fixing the fragments without any attempt at elaborate reduction, will prevent any aggravating effect of the trauma induced by jiggling effect of the fragments. This very often is an important, and sometimes life-saving, procedure in eliminating, to a large degree, the local effect of the fracture on the patient's general condition.

We know of no other way in which this can be done so satisfactorily and with so little additional trauma as by the insertion of pins and fixation with rods. Although traction by Buck's extension may be somewhat helpful, the fragments are not controlled and still allow considerable motion, especially in individuals who are semicomatose, very restless, and thrashing about in bed. Especially in multiple fractures, where the shock is increased so much by the restlessness of the patient, the rapid diminution in the degree of shock which occurs following the immobilization of the fractures by pinning and rod fixation is so definite that we feel it is an important advance in the treatment of such cases.

A

B

C

D

Fig. 1.

A. Child, age 11, femoral shaft fracture; crutch-ambulatory five days after reduction.

B. Fracture distal third of humerus, elbow immobilized, arm supported from proximal humerus to distal ulna.

C. Badly comminuted femoral shaft. Patient crutch-ambulatory in three weeks.

D. Compound comminuted shaft of the femur, associated with skull fracture. Patient crutch-ambulatory four weeks after reduction.

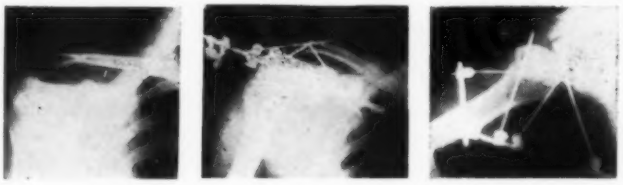


Fig. 2.
Acromioclavicular dislocation immobilized by skeletal fixation and external bars.

We quote as follows from Dr. Paul Magnuson's book on fractures, under the sub-title of "Fundamentals—Highlights": "Shock is caused by fracture and is made worse by handling." Later, when the patient's condition warrants a more accurate reduction, an anatomic reduction frame may be taken to the bedside and attached to the fracture units which were previously inserted, and, after the removal of the immobilization rod, the fracture may be accurately reduced anatomically and checked by x-ray and then the immobilization rod reconnected and the reduction frame removed.

When this technique is employed, burns of the injured limb can also be easily cared for. This type of associated injury is a very frequent occurrence in the present war.

As this is an ambulatory technique, the patient is allowed early motion and activity, thus eliminating long hospitalization of these cases. We all know from experience that it is neither easy nor advisable to care for a patient who is confined in bed in the home, but one who is ambulatory and can care almost entirely for himself is usually ready and willing to return to his home. This shortens hospitalization and helps to relieve the hospital bed shortage. I wish to emphasize that early active and passive motion increases the blood supply and helps to prevent disuse atrophy.

There are several specific injuries in which this technique may be advantageously employed:

Acromioclavicular Dislocations

THESE are injuries we all are called upon frequently to treat, and there is considerable controversy among those of authority relative to the proper and most satisfactory method of treatment. I quote from Dr. Paul Magnuson's latest book on fractures: "It is therefore necessary in all complete dislocations of the outer end of the clavicle to resort to open reduction." And from Drs. Wilson and Cochrane, in their book on fractures and dislocations: "In a limited number of cases with a considerable separation, open reduction may be required with a view to obtaining ankylosis, but it should be borne in mind that many cases with considerable relaxation suffer surprisingly little disability after continuous supportive treatment."

In acromioclavicular dislocations, the external technique is employed for fixation only, which necessitates reducing of the dislocation first. We are not hesitant in advising the use of this technique, as it will assure uninterrupted fixation for a long period of time. We believe that dislocations of this type should be immobilized from 10 to 12 weeks. However, these patients are able to be completely clothed and have active motion with very little limitation of the injured shoulder.

We feel that this type of fixation is more definite over a longer period than is the extensive surgical procedure necessitated in open reduction. In open reduction, unless there is sufficient tissue to fix the sutures securely, a slight re-dislocation may occur. In the majority of cases of open surgery, in addition to the scar that is left, there is usually a definite bony prominence on the injured shoulder, which is the chief complaint in many of these cases.

Femoral Shaft Fractures with Dislocated Hip

FEMORAL shaft fractures associated with obturator and other classes of dislocated hips can now be handled successfully without resorting to extensive open surgery. With this technique, it is possible to immobilize the shaft fracture and then immediately flex the knee and use the limb to reduce the dislocated hip.

Transfixion pins and external fixation supply a practical approach for the treatment of compound fractures. All the advantages of Orr's method are utilized and their disadvantages minimized. This method is invaluable for the fixation of old non-unions following reconstruction surgery and MacMurray and Shauntz osteotomies of the hip. It provides a method of fixation allowing immediate function of the acetabulum, and it is not necessary to use plaster—such as the hip spicas and extensive casts which are usually employed in

A B C D

Fig. 3.

A. Compound comminuted fracture, left femur.
B. Reduced and immobilized by skeletal fixation and exter-nal bars.
C. Bony union; no shortening or other deformity.
D. Patient ambulatory, and at home.

these cases. A special study should be made of the placement of pins and the basic principles of skeletal fixation before attempting to use this technique.

Precision pinning assures a higher average of good results, so we have adopted a standard group of pin sites (as previously advocated by Dr. Roger Anderson), and have reviewed the cross section anatomy of these sites and made a special study of the topography of pins. If one does not understand the pin sites, he is likely to prolong the time of the operation and increase the amount of the anesthetic while he gropes around with a pin or Kirschner wire, attempting to locate a satisfactory point for the insertion of the pin. This means, of course, a prolonged anesthetic and unnecessary traumatizing of the tissue, with danger of infection. One with knowledge of precision pinning reduces the actual time of the procedure of the operation and in this way lessens the danger of shock, or at least minimizes the amount of shock which may already be present in certain cases. Precision pinning enables the surgeon to do a greater volume of his fracture cases under local anesthesia, which minimizes the amount of shock.

Proper knowledge of the topography of pins is a great time saver, as it rules out the necessity of fluoroscopy and enables the surgeon accurately to place his pins without being exposed to the hazard of x-ray burns or extensive x-ray exposure. It also minimizes the number of x-ray plates which are used, which are a burden to the patient as well as a great time loss to the surgeon.

There are other factors and conditions one must thoroughly understand in the insertion of pins. When entering the skin, the pin must be directed straight to the correct position in the bone and must not be inserted in one direction and then changed to enter the bone in a different position. Considerable pressure may be created in any changing of direction.

It is necessary, before pins are inserted, to have the limb in a neutral position in relation to the body. To assure the correct placement of the pins and to avoid creating pressure in the soft parts, one must know the correct position to enter the skin and the bone. After inserting a pin, if it is found to be creating undue pressure in the soft tissues, one should not incise the skin, for this will relieve only the pressure of the skin and not the deeper structures. The pin should be removed and re-inserted.

When the pins involve considerable soft tissue, compression sterile dressings should be used around the pins and sealed to the skin with adhesive tape—this to assure a sterile field for the tissue to extend and recede on the pins. Any motion of the soft tissues alongside a pin during the activity of the patient is compensated by means of this sponge-like dressing. This gives a sterile field along the pin for the tissue to travel. Traveling of the tissue along the pin occurs during any motion of the limb, whether it be when the patient is put on and off the bed pan, or is raising up to take nourishment, or later on when he is crutch ambulatory. We do not advocate continuous changing of the dressings around the pins. In many cases, dressings are not changed until the pins are removed.

Considerable thought must be given to the bearing surface of the metallic pin in the bone. First, dispense with all the unnecessary pressure and then divide the remainder of the pressure over enough bony surface so that pressure necrosis will not be present. The first thought relative to dispersing of pressure to be created on the bearing surface of the pin is the dispersion of leverage, i.e., fractures of the center third of the femur should be supported from the condyle to the trochanters. After the dispersion of leverage, the second consideration is the attempt to increase the bearing surface to be employed without increasing the diameter of the pin, i.e., a transverse pin has one-third less bearing surface than an oblique pin, and, again, a pin inserted across the condyle of the femur has a much greater bearing surface than a pin in the shaft. Likewise, although the cancellous bone is softer, it supports the pin for the full area, whereas a pin in the shaft has supporting structures only in the thin corticle portion of the bone, as the center medullary canal is the soft tissue and gives no support. Therefore, in considering these two locations, we can easily see that the cancellous structure at the end of the bone gives greater bearing surface with more immediate repair.

Special consideration must be given to pathological bone tissue and atrophic bone tissue. In these two, it is best to give a greater distribution of bearing pressure by the use of an increasing number of small pins rather than by the use of one large pin. In this way we distribute the bearing surface pressure over a greater area and lessen the amount of actual pressure per square inch. In pin insertions near the end of the bones, it is always advisable to insert the one closest to the articulating surface first, starting as close to the articulating surface as possible and always directed away from it. This same technique is employed relative to epiphysis, nerves, and vital organs, if the pin is to be inserted close to them.

Fig. 4.
Compound comminuted femoral shaft fracture, associated with fractured skull; pins inserted, in bed.

Skeletal fixation on indicated cases in children is being used successfully. But in these cases a special study should be made of topography of pins with respect to all epiphysis before attempting to use skeletal pinning and external fixation. The immature bones of children are much softer in the shaft than those of adults. However, they are proportionately as strong as those of adults relative to the amount of muscle tension and leverage created against them in comparison to the size of the individual.

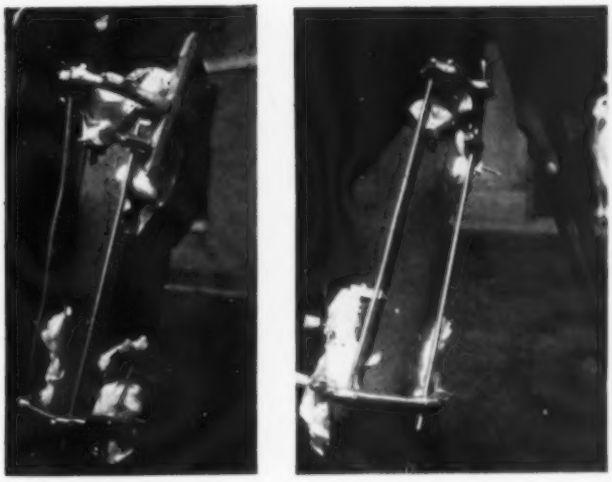
When immobilizing any joints, the elbow or the knee, the pins should not be placed around the area it is intended to immobilize, but at least one pin should be placed in the opposite end of the bone.

The same method is carried out in the use of plaster. If one is immobilizing the knee, the plaster must extend from the hip to the ankle. When immobilizing a fracture or displacement of the ankle, or a fracture of the astragalus, one pin should be placed one inch above the fracture site of the distal tibia and the second pin placed in the usual position in the proximal tibia, with the third pin through the os calcis. This is for the equal distribution of pressure and the dispersement of leverage.

Another example of the dispersion of leverage is in such cases as a fracture of the distal third of the humerus that extends into the elbow, necessitating immobilizing the elbow. In such cases, it is necessary to use fixation in the proximal ulna to the proximal humerus. Then, to disperse the leverage created by the forearm, we find it necessary to insert a half-pin unit in the distal ulna, which is connected to the proximal half-pin unit of the ulna to prevent undue pressure that would be created with this unit. After the fracture is immobilized, a bar may be connected from the distal ulna unit diagonally across to the proximal humerus unit, completing a triangle, dispersing all leverage that may be created on the external immobilization unit.

Contrary to the dispersion of leverage is the use of any fixation at the fracture site, such as Steinmann pins, plates, screws, and Parhan bands or any facsimile used to immobilize the fragments at the fracture site, thus creating a tremendous pressure by the lack of dispersion of leverage, and multiplying the pressure which is applied to the bone. In attempting to immobilize the fragments, one is bound to create a pressure necrosis followed by absorption and degeneration around the ends of the fragments.

It must be kept in mind not to place pins through the traumatic area or across the fracture site, thus avoiding the displacement of fragments that were not formerly displaced, and to prevent interference of



A B

Fig. 5.
A. Lateral view of equipment as used on shaft fracture of femur.
B. Anterior-posterior view of same case.

reduction. There is always an added danger of infection when the pins are inserted in this area. In all cases, the pins must protrude beyond the opposite cortex. When the pins are inserted in the distal end of the femur, the knee should be flexed at a 90° angle while the patient is under the anesthetic to assure active and passive motion during the period of convalescence. All transverse shaft fractures should be impacted periodically to disperse with absorption and assure contact during the period of healing. As definitely as this technique will immobilize the fragments in contact, it will also immobilize the fragments with a separation at the fracture site, causing a delayed union or non-union if the surgeon fails to bring these fragments into contact.

We all know, according to our highschool physics, that it takes two different metals submerged in fluids to create a battery action. But, as we use similar metals, we have never encountered electrolysis or a bone condition created by electrolysis in our experience with pin fixation.

Conclusions

TRANSFIXION pins and external fixation offer very definite advantages in industrial surgery.

2. They are invaluable in fractures of extremities associated with skull fractures and internal injury.

3. Precision pinning assures a higher average of good results, and offers a practical approach for the treatment of compound fractures.

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IN "THIS MONTH" (p 6) it is stated that the AMERICAN ASSOCIATION OF INDUSTRIAL PHYSICIANS AND SURGEONS will begin the 1944 Annual meeting at St. Louis on Thursday, May 11. The form in which that page appeared had gone to press before the change in the program which puts the opening meeting on Wednesday, May 10, was made. The correct schedule appears on page 307.

Ultra-Violet Radiation

—Its Role in Industrial Medicine—

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THE invisible ultra-violet rays occupy in the electro-magnetic spectrum the space between the visible light and the roentgen rays.

They are carriers of considerable amounts of energy which enables them to perform a great variety of chemical reactions. Accordingly they have also been called "chemical rays" and, because of their ability to produce chemical changes, ultra-violet radiation has found extensive application in industry.

For the physician engaged in industrial medicine, the interest in ultra-violet radiation is based not only on the extensive industrial application of this type of rays and their importance as a possible source of industrial hazards, but also in their intensive biologic action which makes ultra-violet radiation an important tool for the physician in the preservation of the health of workers, and, finally, as a means of increasing the work output.

Thus, a survey of the role of ultra-violet radiation in industrial medicine divides itself into three parts: (1) health hazards from the use of ultra-violet rays in industry; (2) ultra-violet rays as a health factor in industrial medicine; and (3) ultra-violet rays as a means for increasing the work output.

The natural source of ultra-violet rays is the sun. Knowledge of the therapeutic action of sunlight is one of mankind's oldest intellectual possessions. As a vivid expression of this we find the sun worshiped as a health bringing deity in all ancient cultures in all parts of the world. However, in the Middle Ages, when man was separated from his close association with nature by development of town life, the lore relating to the healing power of sunlight was lost with much other knowledge of nature.

Scientific investigation of the action of sunlight made only very slow progress in the 19th Century, in spite of the advances in other departments of medicine and natural science. In 1877 two English scientists, Downs and Blunt, discovered the bactericidal action of sunlight, a discovery which has acquired great importance for the industrial medicine of our time.

The pioneering work in the study of sunlight was first begun during the last decade of the 19th Century. It was a Danish physician, Niels Rydberg Finsen, who, through ingenious and simple experiments, established the fact that two of the outstanding effects of sunlight, the bactericidal action and the production of sunburn or photo-erythema, were caused by the invisible ultra-violet rays emitted by the sun. Investigators in all parts of the world have since been engaged in systematic research of the physical and biological properties of ultra-violet radiation.

In the field of physics it was recognized that the sun was a very unstable source of ultra-violet radiation, because the content of sun ultra-violet was found to vary with time of the day, the season of the year and the elevation above sea-level. Because of these variations in the ultra-violet output of the sun, development of artificial sources for ultra-violet radiation took place. As a result of these efforts we find today the following three main types of artificial sources: (1) the arc lamps—most widely used and best known as carbon arc and mercury vapor arc lamps; (2) the glow lamps—most frequently used is the hydrogen discharge tube; and (3) the spark lamps—where a discharge takes place between cold electrodes, e.g., iron electrodes (iron spark).

So much for the physical and technical aspect.

WE NOW consider some of the biological aspects of ultra-violet radiation. As the result of biological research it has been possible to differentiate between ultra-violet erythema and that produced by heat, by establishing the fact that ultra-violet erythema appears only after the lapse of a certain time after exposure, the so-called latent period.

The mechanism of photo-erythema has also been determined, and it has been found that this phenomenon is produced by the formation of substances of great pharmacological activity, similar in action to histamine—most probably predominantly histamine itself. The action of these histamine-like substances has been found not to be confined to the directly exposed area of the skin. Through the blood-stream they are carried all over the body, influencing the entire metabolism. It is this indirect action of ultra-violet irradiation which is of special interest to industrial medicine, as will be seen later.

The formation of vitamin D by ultra-violet rays is so well known that merely mentioning this important photo-chemical effect seems to be sufficient.

The newer concepts concerning the defense mechanism of the skin against irradiation by ultra-violet radiation, the so-called photo-adaptation, should be mentioned. While the experiments made by Finsen seemed to point out that the pigment produced by ultra-violet rays in the skin is the defense mechanism, more recent investigations have shown that this is only partly true. As the result of these recent investigations it can be said that photo-adaptation, as well as the variation of the sensitivity of the skin of various parts of the body, depends on the thickness of the horny cell layer of the skin. The defense of the skin against the insult by ultra-violet irradiation is brought about by an increase of this horny cell layer which thus screens out the harmful rays. Skin pigmentation is an incidental accompaniment of this thickening and is only a part of the defense mechanism. So much for the biological aspects of ultra-violet radiation.

Turning now to the problem of ultra-violet radiation as a health-hazard, this subject divides into two parts: (1) acute injuries, and (2) chronic injuries.

The acute injuries are as follows:

(a) *Inflammation of the Eye:* The lids and conjunctivae are particularly affected. Owing to the fact that the conjunctivae are lacking in protection of horny cells, they are especially sensitive to irradiation. Exposure of a few seconds is sometimes sufficient to produce a very painful conjunctivitis which appears after a latent period. Evidence of this is a very unpleasant foreign body sensation. Blepharitis, lid edema, and even blepharospasm may develop.

The prognosis of this symptom complex is usually good. The symptoms disappear after a day or two.

Prevention of these injuries is easy. Use of goggles will exclude injury to the eye with certainty, because ordinary window glass absorbs the harmful rays almost completely.*

(b) *Inflammation of the Skin:* Depending on the exposure, severe erythemata up to blister formation may occur after a latent period of a few hours. Without secondary infection the prognosis for restoration of the skin is good. However, hyperpigmentation may

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persist for years. Hands, face and neck are most likely to be injured in this way. Gloves and masks, made from tightly woven material, offer sufficient protection.

(c) *Metabolic Disturbances:* A short exposure to ultra-violet radiation has been known to produce thyrotoxic symptoms, such as palpitations, tremor, emotional outbursts, etc., which are typical in Grave's disease, in persons belonging to a certain constitutional group, the so-called sympathicotonics. The symptom complex exhibited by these persons, namely, shiny appearance of the eyes, hyperhidrosis, some tremor, expressive dermographism, psychoneurotic tendencies, can easily be described as a "miniature Grave's disease."

The explanation for the action of ultra-violet radiation in this constitutional type consists, according to my observations, in the fact that this group shows a decidedly increased sensitivity of the skin towards ultra-violet rays throughout the year.

Thus relatively small exposures release larger quantities of histamine-like substances. Since it has been demonstrated experimentally that histamine increases the blood supply of the thyroid gland, and, as it is well known that increased blood supply means a higher activity of the gland, the thyrotoxic sympthoms in this constitutional group are easily understood.

Attention may be called to the fact that this group is very prone to the development of gastric and duodenal ulcerations. A flare-up of gastric symptoms, after an ultra-violet erythema was provoked, has also been observed in these patients.

The following are the possibilities for chronic injuries:

1. *The Eye:* The formation of cataracts has been observed, but the etiology is disputed. The observed opacities are probably due to the presence of the more penetrating infra-red rays, emitted simultaneously by artificial ultra-violet sources, and admittedly capable of producing cataracts. On the basis of animal experiments Vogt believes that cataracts in workers exposed to fire (welders, glassblowers, etc.) are due to the action of infra-red rays rather than ultra-violet. According to the investigations of Jannet Clark, the combined effects of ultra-violet rays and hypercalcemia may be significant in the etiology of senile cataracts.

2. *The Skin:*

(a) Production of dermatoses by the combined action of certain organic substances and ultra-violet rays has been observed. Chronic exposure to such chemicals as tar and tar products of the acridine and anthracene group are able to sensitize the skin so that even the daily exposure to sunlight may produce harmful effects. (Foerster and Schwartz.)

(b) Production of skin cancers: In recent experiments the carcinogenic action of ultra-violet rays has been established beyond doubt. Whether the carcinogenic action of ultra-violet rays is an etiologic factor also in human skin cancers, is still disputed. However, the possibility of increasing the development of skin cancers by the combined action of carcinogenic chemicals (tar, tar products) and radiation on the skin, cannot be denied.

This short review of the role of ultra-violet radiation as a possible health hazard in industry shows that *ultra-violet rays are not as innocuous, as it is frequently assumed,* but they compare very favorably with their spectral neighbor, the x-rays as a danger source.

*Because of the high intensity of visible rays emitted by all ultra-violet light sources, the common use of colored glasses is well indicated to cut down also the effects of these rays.

In summary it can be said that *injuries caused by ultra-violet radiation are chiefly due to over-exposure or sensitization,* either constitutional or artificially produced.

WE TURN now to a discussion of the role of ultra-violet radiation as a health factor in industrial medicine.

The accumulation of larger numbers of people in one workroom increases the dangers of air-borne infections. This fact is of particular interest in the present war emergency.

To counteract these undesirable conditions, ultra-violet radiation is a valuable tool in industrial medicine, owing to its germicidal (bactericidal) action.

The judicious use of the bactericidal action of ultra-violet rays for the sterilization of the air of the workroom seems to be an important contribution of radiology to the furtherance of the war effort. In this way ultra-violet radiation may contribute in cutting down absenteeism due to infections of the upper-respiratory tract. A detailed discussion of this, however, is beyond the confines of this presentation.

Another application of ultra-violet radiation in industrial medicine, which seems to be of special interest with respect to the war effort, is the possibility of increasing the work-output of the individual worker by ultra-violet irradiation.

In careful studies of the basal metabolism, Lehmann and Szakal were able to demonstrate that brief but intensive irradiation with ultra-violet light produced a rise in the basal metabolism which persisted up to 22 hours. The rise coincided with the appearance of skin erythema. All precautions had been observed to avoid interference by temperature changes and other factors, well known to increase basal metabolism. The coincidence of rise in metabolism with the appearance of erythema, leads to the conclusion that the action of histamine-like substances is involved. Indeed, it has been demonstrated experimentally that injection of histamine results in a similar rise in the metabolic rate.

While one brief but intensive irradiation produces a rise in basal metabolism, the repeated irradiation leads to a fall, which can still be noted three to four weeks after the last exposure. The basal metabolism falls approximately 10 to 15%. This phenomenon, too, can easily be explained on the basis of the action of histamine-like substances.

In the light of these studies the observation of increased work output after ultra-violet irradiation is easily understood. Lehmann and Szakal found that, following irradiation, the caloric requirement during work decreased so that up to a 60% increase in work capacity resulted. These data were obtained by means of measurements with the bicycle ergometer.

According to these authors the increase in work capacity is caused by increased efficiency and decreased fatigability. Since these accomplishments can be achieved without risk, it seems to be a reasonable procedure for the improvement of workoutput of the individual worker, especially if and when a top performance over a limited time is required.

From what has been said, it is evident that *this is a problem of individual treatment of the worker,* and that full accomplishment can only be expected if treatment with ultra-violet radiation prevents photo-adaptation of the skin. This in turn means an understanding consideration of all factors influencing the radio-sensitivity of the skin. A detailed discussion would, however, be beyond the limits of this presentation.

IN THIS short review, we have attempted to point out the benefits and risks involved in the use of ultra-violet radiation and to explain the reasons for these reactions.

We believe that the relative sterilization of the air by ultra-violet radiation in rooms where workers are closely grouped will cut down communication of diseases in so far as the organisms producing them are air-borne.

We furthermore believe that the judicious use of general body exposure to ultra-violet rays is able to increase the efficiency of individual workers as producers.

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THE following books may be consulted for detailed information on the subjects discussed in this paper:

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Acceptance of Ultra-violet Lamps for Disinfecting Purposes. *J.A.M.A.*, 122:8, p. 503, 1943.

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Health Education

Review by

C. O. SAPPINGTON, M.D., Dr.P.H.

HEALTH EDUCATION ON THE INDUSTRIAL FRONT, Report of the 1942 Health Education Conference of the New York Academy of Medicine. Columbia University Press, New York; 63 pages, 1943.

THE material of this report consists of a foreword by IAGO GALDSTON, M.D., Secretary of the Steering Committee, and address of welcome by MALCOLM GOODRIDGE, M.D., President of the New York Academy of Medicine, and an introduction by DONALD B. ARMSTRONG, M.D., Chairman of the Conference.

The contributors and their subjects are as follows:

CASSIUS H. WATSON, M.D., Medical Director, American Telephone & Telegraph—"The Wartime Industrialization of the Community and its Health Implications";

OTTO A. BESSEY, PH.D., Director, Public Health Research Institute of the City of New York—"Food and Nutrition in the Home and in the Work Place";

LEONARD GREENBURG, M.D., Executive Director, Division of Industrial Hygiene, New York State Department of Labor—"Disease and Handicap Detection and Control in Industry";

LYDIA G. GIBERSON, M.D., Psychiatrist, Home Office Medical Staff, Metropolitan Life Insurance Company, New York City — "Medical Problems and Morale in Industry";

HAROLD I. BIXLER, Personnel Director, Mutual Life Insurance Company, New York City—"Educational Methods and Control of Accidents in Industry."

Wartime industrialization of the community was emphasized as being particularly important because of the use of a larger number of women in industry. Moreover, the intensified industrialization brought on by the war has placed industry in the most favorable position to use more effectively the application of the newer knowledge of nutrition to the betterment of public health.

The problem of control of disease and the use of handicapped workers in its widest sense may be stated as a necessity for employing all who can work and keeping them working a maximum number of hours consistent with maximum production.

The morale problem in industry can be simply summarized: national morale does not have to be—it grows out of personal identification with the national destiny; industrial morale is of the greatest significance if we are to reach peak production so necessary to the successful conclusion of the war.

In the morale program the industrial physician can be of greatest service in meeting the emotional problems of his plant and maintaining a high industrial morale by following the simple guideposts described by DR. GIBERSON.

In conclusion, educational methods and the control of accidents in industry are grouped under several motives: The patriotic motive, in which data are used to compare the mortality due to accidents and to war casualties; the economic motive, which is expressed by the slogan "Safety devices are cheaper in the long run than accidents"; and the humanitarian motive, through which many managements have to be approached in order to become interested in the control of industrial accidents.

Applied Dietetics

Review by

ERICH SACHS, M.D.

APPLIED DIETETICS: The Planning and Teaching of Normal and Therapeutic Diets. By FRANCES STERN. Ed. 2, Baltimore, The Williams and Wilkins Company, 1943.

THE NEW edition of this outstanding textbook of applied dietetics has utilized to its full extent the rapidly increasing wealth of scientific information on nutrition. This book, originally conceived in the frontline of nutrition, in immediate contact with the patient who not only had to eat the diet, but also had to understand its principles, has expanded into an all-purpose manual. It is equally fit for planning individual meals, feeding a family, or any number of people, and providing dietaries in health as well as for therapeutic purposes. Numerous tables simplify the task of planning to such extent that this book should prove an invaluable aid in industrial plant cafeterias and any type of large-scale feeding programs. It will greatly facilitate the increasingly more difficult accomplishment of the nutritional goal of all concerned with providing meals in industrial plants: to offer optimal food values, present them in the most adequate form, satisfy taste and appetite, and achieve these results within a given economic frame.

There are only a few minor details with which this reviewer does not completely agree. In Part I, Chapter 1, the protein problem is given so little space that the role of the cereals as a protein source may easily be under-estimated. The proteins of vegetable foods must not necessarily be supplemented with animal protein to ensure the maintenance of life and the support of normal growth. They are not inferior as such, but can very well supplement each other without any help from proteins of animal origin.

The difference between proteins from individual animal or plant sources lies in the frequency of occurrence of the complete assortment of essential amino acids.

In computing the daily protein requirement no other standard should be used than the ratio of grams of protein per Kg. of body weight. Since the protein requirement does not depend upon the caloric requirement—a man of 70 Kg. needs exactly as much protein at rest as at hard work—the caloric requirement for moderate activity is only incidentally a basis for computation of the daily protein need.

Such double derivation is bound to create misconceptions or to enhance their survival.

On page 97, the energy requirements of adults for various grades of activity per Kg. of body weight are given per 24 hours. We would have preferred values per hour, since no occupation is performed over a 24-hour period. Thus, the adult's energy requirement for any kind of activity would be computed as the sum of the constant basal energy requirement per day plus the variable additional requirement per hour of this activity times the number of hours worked.

In Part III (Dietary Outlines), it would have been worth while to call attention to the influence of medication upon absorption of nutrients, and to suggest preventive measures against the consequences of undesired side-effects, such as exerted upon iron absorption by alkalization in peptic ulcer, or by certain laxatives upon absorption of fat-soluble vitamins in constipation.

Vitamin K Therapy in Menorrhagia

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ABNORMAL menstrual bleeding, as is well recognized, may result from a great variety of causes, both local and systemic in origin. Even after careful investigation, however, there remains a large percentage of cases where the cause cannot be ascertained.[1] The findings of the present study suggest that impairment of the prothrombin mechanism in blood coagulation may be a frequent and important contributory factor in menorrhagia.

Observation of striking improvement with vitamin K therapy in a case of severe menorrhagia with prothrombin deficiency led us to undertake investigation of its therapeutic effect in a larger series of cases which we present here as a preliminary report. Prothrombin formation occurs in the liver, and impairment of this function as indicated by prolongation of the prothrombin time, is a sensitive index of hepatic integrity. The recent demonstration of Heilig and Kantiengar[2] that liver function is impaired regularly during menstruation suggests that a disturbance in the prothrombin mechanism, which is essential to blood clotting, may play a role in certain cases with excessive menstrual bleeding. Vitamin K is intimately concerned with prothrombin formation and its administration is indicated where prothrombin deficiency exists.

Material Studied

VITAMIN K* was given to a total of 43 patients, chosen from employees at the Equitable Life Assurance Society home office, with chronic dysmenorrhea and menorrhagia who presented themselves at the hospital regularly for symptomatic treatment and rest periods. No other medication than vitamin K was employed. The dosage varied slightly, averaging 20 five-milligram tablets taken over a period of five days. Medication was begun in most cases one or two days before the onset of menstruation or on the first day of the menses.

Observation was recorded of the effect on duration of menses, amount of flow, character of flow with particular reference to clots, and dysmenorrhea.

Results

DURATION OF MENSES. In 12 cases with history of prolonged menstrual flow lasting six days or longer, the duration of flow was reduced by one or more days less than the usual length of flow in eight cases, and was unchanged in four cases. Shortening of the menses was less marked when they were of normal duration. In 26 cases the usual length of flow was five days or less. Of these cases the flow was abbreviated in eight cases, unchanged in 16 cases, and prolonged in two cases.

Analyzed in terms of total cycles studied rather than cases, the same trend is manifest. Where the usual flow was six days or more, the flow was abbreviated in 18 cycles, unchanged in 12. When the usual flow was five days or less the duration of flow was unaffected in 44 cycles, shortened in 11 and prolonged in five.

AMOUNT OF FLOW. The amount of flow was unchanged in 17 cases, decreased in nine cases and was stated to be increased in eight cases. Where the flow was stated to be increased it was remarked in many instances that the flow was more profuse the first day of the menses rather than over the entire period of menstruation.

CHARACTER OF FLOW. Twenty-six of the cases studied usually had clots during menstruation. Of these the clots disappeared or diminished in 16 cases, were unchanged in eight cases, and increased in two cases.

DYSMENORRHEA. All the cases studied usually suffered from moderate to rather severe menstrual cramps. Of the total of 43 cases dysmenorrhea was lessened or abolished in 28 cases, and was unaffected in 15 cases. Analyzed by individual cycles dysmenorrhea was lessened or abolished in 59 cycles, unchanged in 23 cycles and increased in four cycles.

Comment

MOST striking was the finding of significant abbreviation of menstrual flow in two-thirds of cases where it was prolonged beyond five days. Not only was the flow less profuse in these cases but its character was altered in many instances. Clots occur frequently in menorrhagia, and these were reduced or disappeared in the majority of cases in subjects with flow of normal duration as well as those in which there was prolonged menstrual bleeding.

While it is well known that menorrhagia may occur in blood dyscrasias[3] the possibility does not appear to have been considered that a disturbance in the blood clotting mechanism may play a part in the large percentage of cases with menorrhagia unaccounted for by local causes such as endometrial hyperplasia and submucous fibroids. Recent investigations by Lozner, Taylor and Taylor[4] and by Glueck and Mirsky[5] indicate that the blood clotting mechanism plays a part during menstruation. These authors have shown that the reason menstrual blood fails to clot is that clotting occurs regularly in utero. Menstrual blood, as shown by the studies of the above investigators, is in reality serum containing the formed elements of blood and epithelial cells, and is lacking in prothrombin and fibrinogen. The fate of the fibrin clot is not known, but it presumably undergoes autolysis. Where the clotting mechanism is impaired, as in prothrombin deficiency, it is not surprising, therefore, that abnormalities in menstrual flow should result. That such a disturbance in the clotting mechanism may exist frequently during menstruation has already been suggested on the basis of Heilig and Kantiengar's observations[2] that hepatic function is regularly impaired on the first day of menstruation.

We have not carried out prothrombin studies in the series of employees with menorrhagia treated with vitamin K. In two other cases with menorrhagia, however, it was found, employing the Quick method, that the prothrombin time was prolonged at the onset of menstruation. Vitamin K beneficially influenced the menorrhagia in these cases and restored the prothrombin time to normal in one subject. Definite positive cephalin flocculation tests at the time of menstruation in both subjects afforded further evidence of impairment of hepatic function. The cause of impaired hepatic function at the onset of menstruation is not known, but may be related to an increase in estrogenic hormone which attains its maximum level just preceding menstruation. There is some evidence to indicate that estrogens, natural as well as synthetic, may have a toxic effect on the liver.[6a] It is well known, as Andrus[7] remarks, "that patients with varying degrees of liver damage may fail to respond adequately or at all to the administration of substances with vitamin K activity"; and it appears that there may be another action of vitamin K in addition to its effect on prothrombin formation. As pointed out by Lichtman,[6b] "In some instances, the administration of vitamin K will promptly stop bleeding even

*Synkavite (Hoffman-La Roche) was the preparation employed. This is a synthetic naphthoquinone with pronounced vitamin K-like activity.

though there has been no evidence of hypoprothrombinemia. Vitamin K must also, therefore, possess anticoagulant properties which act independently of the prothrombin mechanism in some instances."

The finding of relief from dysmenorrhea in almost two-thirds of the cases studied was not anticipated. Realizing that there is a large psychological factor in dysmenorrhea, an attempt was made to evaluate these findings objectively by administering a placebo identical in appearance with the preparation of vitamin K employed. The placebo was administered to nine subjects who had remarked consistent improvement in dysmenorrhea. In four of these subjects cramps recurred while taking the placebo, whereas five cases observed no difference from the effect noted while taking vitamin K. It is of interest that two of these cases had a recurrence of profuse and prolonged menstrual bleeding while taking the placebo, which had not at any time occurred when vitamin K was administered.

The immediate cause of cramps accompanying menstruation is the presence of a foreign body (blood) in the uterine cavity which stimulates the uterus to contract. Hypertonicity of the uterus, resulting from predominance of the follicular hormone over the luteal hormone which inhibits uterine contraction, is an important contributory factor. Other changes such as pelvic congestion and psychologic disturbances are undoubtedly important in many cases. Since bleeding into the uterine cavity is the immediate stimulus to the uterine contractions which produce the cramps, it seems possible that a change in the character of the bleeding process brought about by vitamin K may alter the stimulus to and frequency of uterine contractions. Such a hypothesis, however, is at best speculative, and the improvement in dysmenorrhea recorded in the majority of cases must be interpreted with great reserve. As already remarked, dysmenorrhea is influenced greatly by psychological factors, and the experiments with the placebo did not provide conclusive proof that vitamin K was the factor responsible for improvement in dysmenorrhea.

Vitamin K may however prove to be a helpful adjuvant in the prevention of dysmenorrhea, in addition to its indication in menorrhagia, when employed premenstrually in conjunction with other therapeutic agents such as the luteal hormone which inhibits uterine contractions.

Conclusions

ADMINISTRATION of vitamin K is a useful measure in controlling menorrhagia, where this disorder is not accounted for by local pelvic abnormalities. Its beneficial influence is probably related to its action on prothrombin formation. Prothrombin function is a sensitive index of hepatic integrity, and there is evidence that hepatic function is regularly impaired at the onset of menstruation. Relief from dysmenorrhea was noted in approximately two-thirds of a series of 43 cases treated with vitamin K. Possible reasons for this finding are discussed. It is concluded that, in addition to its beneficial action in menorrhagia, vitamin K may be of value as an adjuvant in the prevention of dysmenorrhea employed in conjunction with other agents, such as the luteal hormone, which directly inhibit uterine contractions.

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Venereal Diseases in Industry

—Their Control as a Public Health Function—

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IT IS ESTIMATED that there are three and one-fifth million cases of syphilis in the United States; one in every 42 persons has syphilis now.[1] This is a staggering figure, and to reduce this rate is a problem that challenges the medical structure of our country. The fight against syphilis cannot be won by any one group or agency; it requires the cooperation and the help of all.

In the fight against syphilis the health departments must work as a coordinating agency and assist in the development of the various programs that are directed at the reduction of the incidence of the disease. The approach through industry is one of the important phases of syphilis control.

THE MOST important aspect of venereal disease control is case finding. Such a program is advocated by the Surgeon General of the U. S. Public Health Service.[2] He recommends that an educational program be developed which will teach employees the facts about venereal diseases, how they are contracted, their method of spread, and how they may be cured. He further recommends that routine blood tests should be made on all applicants for employment, that routine blood tests should be made on all routine re-examinations, and that strict confidence should be maintained between the employee and the physician as to the results of the examination. Frequently, however, the plant does not conduct any employment examination and is not equipped to do so. In other instances the labor union has a specific clause in the work contract forbidding plant employee examinations.

The epidemiologic facilities of every health department engaging in a venereal disease control program are concerned with this important procedure of case finding. In so far as industry is concerned, the approach to case finding should be conducted through education and serologic surveys. The educational approach is a prerequisite to the conducting of the serologic survey.

In this approach to case finding in industry all available media of propaganda should be used. The propaganda facilities available for carrying on such a program are the use of lectures, distribution of leaflets to employees, use of placards on plant bulletin boards (in lavatories and locker rooms), and insertion of leaflets in pay envelopes. It has been our experience in San Francisco that to carry on an adequate industrial venereal disease educational program it is important for the health department to offer its assistance to industry in organizing such a program and to provide these necessary facilities.

During 1940 and 1941 such a venereal disease educational program was conducted through the media of the labor unions. This educational approach has the advantage of ready-made audiences and offers no interference in so far as the plant operation is con-

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cerned. The approval of labor unions officials was secured for the contemplated educational program, and a "Special Health Bulletin"[3] was prepared by the health department for issuance and distribution by the local labor unions. The nature of venereal diseases was discussed in this "Special Health Bulletin," the value of routine seroligc examinations was explained, and information was offered as to the time and place where blood tests would be taken. Doctors, public health nurses, and clerical personnel were furnished by the health department at blood-taking stations established at the various local labor union halls.

With the event of Pearl Harbor, labor union audiences at local labor union meetings became less readily available because the pressure of work prevented full attendance at union meetings; in many instances, such as in the Metal Trades Union, regular labor union meetings were no longer held. In view of this new sociologic change it became necessary to develop a venereal disease educational program in the plant. The plan of procedure for this program was as follows:

1. To secure permission and cooperation of labor union officials concerned to conduct an educational program and serologic survey on members working in the plant;
2. To contact plant management and solicit its support and permission for the contemplated program;
3. To arrange special meetings with plant stewards and foremen to advise them of the objective of the program and to relay this information to the employees;
4. To distribute literature, placards, plaques, etc.;
5. To assemble employees for lectures, if possible;
6. To offer serologic examinations following the educational program.

The educational program should include information as to the nature of venereal diseases, the method of prevention, the value and importance of early and complete treatment, the dangers of quack treatment, and the importance of a routine serologic examination for the discovery of syphilis.

An important consideration to the approach of syphilis case finding is whether or not serologic surveys should be conducted by plant management, by labor unions, or by the health department. If such serologic examinations are conducted by plant management there may be considerable apprehension on the part of the worker that knowledge by management of the results of the serologic examination, if positive, may affect the outcome of his application for employment or his continuance of employment. This fear has resulted, in many instances, in refusal by labor unions to permit routine examinations by the employers. This situation has come about because, in some cases, management has failed to accept applicants, or to continue in employment, persons with a positive serology who have non-infectious syphilis. Conditions such as this must be rectified by education of management. They must be advised that persons with non-infectious syphilis under treatment are employable and at no time should employment be refused because of a positive serology. Labor union officials must be taught that routine serologic examinations of their membership is important in detecting syphilis, and that undiagnosed syphilis is both a health and a financial hazard to the worker.

Apprehension regarding serologic examinations can frequently be eliminated by having them conducted by an agency other than the plant management. The other agencies that would be most eligible to perform this field service are the unions or the health department.

In the majority of instances in the West, the labor unions have not developed their health programs to a point where they are in the position to offer such service to their membership; therefore, the responsibility of this important function is placed upon the health department. The health department can act as an unbiased agency, thus eliminating the suspicion of the employee regarding the management, and also offering a service the labor unions are not as yet in a position to offer.

It is quite conceivable that in the future labor unions may be able autonomously to offer this service to their membership. It would, perhaps be desirable to have labor unions require complete physical examinations of their members before being admitted to union membership, and require regular serologic examinations thereafter. However, in no instance should the employer or labor union refuse to employ or refuse to admit to membership a person found to have syphilis if he is willing to be adequately treated. The health department should assure both the management and labor union that those persons known to have syphilis will be placed under treatment, or that they will be notified so that the employee will not become a potential health hazard both from the point of view of the general public and the industry concerned.

The worker is prone to oppose serologic examinations performed by labor union or management because of potential employment discrimination. The procedure of having the examination conducted by the health department as an unbiased agency pledged to maintain the confidential nature of the report is thus more likely to meet the approval of the worker.

Upon finding him to be infected and completing a diagnosis on the individual, the health department must refer the patient to a proper treatment agency or furnish free treatment to the patient if he is unable to pay for it. The health department must also educate industry to the point that if it does know that an employee is syphilitic it will not penalize the employee willing to accept treatment. This opinion is shared by many public health workers.[2,4,5,6] The health department, through its case holding program, must attempt to keep the patient under treatment so that the syphilitic employee will not be a hazard to industry as the result of his disease. In the eventuality that the employee is found to have cardiovascular syphilis, tabes dorsalis, or paresis, the health department should make arrangements to see that he engages in an occupation commensurate with his physical abilities. If such an employee is, for example, a crane operator or locomotive engineer, it is important that he change his occupation to one that will not be a hazard to himself and to his fellow employees.

Management and labor union members assume the responsibility for assisting the health department in holding the patient to treatment. For example, if a patient lapses from treatment the labor union should assist the health department in locating the patient through its address files, and management is justified in advising employees that syphilitic workers who are unwilling to continue treatment must expect discharge from employment.

As part of the case holding procedure, the health department should advise the patient of the nature and symptoms of his disease and the importance of continuous and complete treatment before referring him to a treatment agency.

The routine survey diagnostic case finding procedure for syphilis does not apply to the case finding of gonorrhea, chancroid and lymphopathia venereum in industrial workers. Owing to the essential character-

istics of these diseases, they are not amenable to reliable survey laboratory diagnostic procedures. The gonorrhea complement fixation test,[7] the Frei test,[8,9,10] and the Ducrey test[11] may be negative during the active stage of the disease and may remain positive long after the infection has subsided. In addition, false negative and false positive reactions are of too high an incidence in these procedures. Consequently, the industrial approach to the control of these diseases must depend upon the educational aspects of the industrial venereal disease control program by advising the employee of the importance of a suspicious attitude toward all genital lesions and encouraging him to seek medical advice upon the appearance of any genital symptoms.

Incidence of Syphilis in Industrial Workers

OF SOME 8,000 industrial workers who have been examined in the San Francisco area, negroes have shown the greatest incidence of syphilis; 20% had a positive serology. The next greatest incidence of syphilis was found among the Filipinos, 13% of whom had a positive serology. The Mexician workers showed a 10% incidence, while white workers were the lowest with a 3.2% incidence. The over-all incidence of positive serologic reactions in industrial workers in the San Francisco area has been found to be 4%. Of these workers who were found to have a positive serology and reported to the health department for subsequent examination, 70% were previously unknown cases.

The results of industrial serologic surveys thus definitely point to the finding of a considerable amount of unknown syphilis. It should be emphasized, however, that this type of public health approach does not usually find infectious syphilis, namely primary or secondary syphilis. Consequently, industrial serologic surveys do not have as their main objective the control of the *spread of syphilis* but rather the discovery of *unknown and untreated non-infectious cases of the disease*, thus saving industry and society the disaster and expense of undiagnosed late syphilis; saving industry expensive accidents resulting from unknown and untreated cardiovascular and neurosyphilis; and giving increased years of earning power to the infected worker by placing him under treatment.

Serologic surveys in the San Francisco area have led to the discovery of 28 cases of previously unknown latent syphilis per 1,000 persons examined. The percentage of workers found with a positive serology varies considerably with the economic and social background (occupation) of the individual as shown in Table I.

TABLE I.
INCIDENCE OF POSITIVE SEROLOGY BY OCCUPATION AS FOUND IN VARIOUS INDUSTRIAL SURVEYS IN THE SAN FRANCISCO AREA

Occupation	Total Tested	Number Negative Serology	Number Positive Serology	Rate per 1000
Unskilled Laborers	1635	1553	82	50
Semi-skilled Laborers	2934	2799	135	46
Skilled Laborers	2072	1995	77	37
Office Workers	235	225	10	43
Professional Workers	271	268	3	11
TOTAL WORKERS	7147	6840	307	43
Others	461	451	10	22
Unknown	323	307	16	50
GRAND TOTAL: All Workers	7931	7598	333	42

Professional workers such as doctors, nurses, lawyers, school teachers, and superintendents, show the lowest incidence, while unskilled laborers such as hod carriers, bell boys, porters, messengers, poultry workers, etc., show the highest incidence of positive serology. Office workers show a higher incidence than might be expected, but this group in our series includes salesmen, store clerks, etc., who usually have a higher incidence than office workers such as stenographers, file clerks, accountants, bookkeepers, etc.

Various industrial surveys of some 425,000 workers tested in 800 miscellaneous industrial plants located in 25 communities have resulted in approximately 30 of every 1000 persons examined having been found to be positive for syphilis.[1]

The largest serologic survey ever undertaken is the present serologic examination of all selective service examinees. An inspection of some of the information obtained from the examination of the first two million selectees (Table II) is worthy of comment. There is an increasing prevalence of syphilis with the increase in age of the group. In this survey syphilis was also much more prevalent among negroes than among other races; it was also least prevalent in the white race. Dyar,[12] comparing the incidence of syphilis in various races in San Joaquin County, found it to be most prevalent in the negro, 273.4 per 1000; Filipino, 133.3 per 1000; Chinese, 120.7 per 1000; white, 34.3 per 1000; and least prevalent in the Japanese, 22.5 per 1000. Cornely[13] found syphilis to be 10 to 20 times higher in negro than in white college students. Burney,[14] working in Georgia, found the syphilis rate of negroes to be more than five times the national rate among whites.

California has a syphilis rate of almost half that of the nation as a whole, but analysis of the figures show that the incidence in the white race is slightly higher than the national rate, while the rates for races other than white, and for negroes are somewhat lower. California's lower rate for all races must be based on a lower ratio of negroes to the general population and not on the basis of an over-all lower rate. The U. S. Census Bureau reports[15] as of April 5, 1940, that the ratio of whites to negro for the United States is 10 to 1 while the ratio for California is 55 to 1.

Of 953 selective service cases found to have a positive blood test at the time of their first draft board examination and who were investigated by the San Francisco Health Department, 533, or 56%, are being treated by private physicians. Of these 953 cases, 794 reported to the health department and only 217, or 27%, were found to be financially eligible for clinic care and were treated by the health department clinics, the remainder being referred to either private physi-

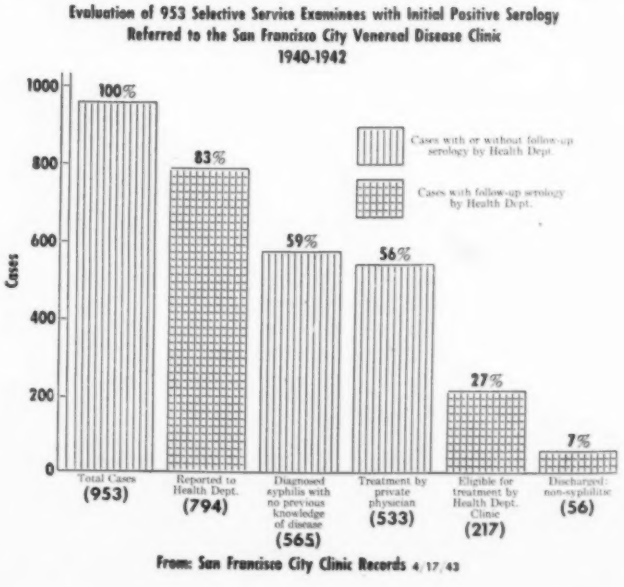

TABLE II.

PREVALENCE OF SYPHILIS AMONG SELECTEES AND VOLUNTEERS
Based on the first two million reports received
during the period November 1, 1940, to
August 31, 1941*

For the United States and California

UNITED STATES					CALIFORNIA				
Race	Age Group in years	Total persons tested	Total persons syphilis detected	Syphilis rate per 1000 persons tested	Race	Age Group in years	Total persons tested	Total persons syphilis detected	Syphilis rate per 1000 persons tested
White	18-20	17,614	195	11	White	18-20	687	7	10
	21-25	947,776	9,677	10		21-25	62,997	650	10
	26-30	474,300	9,952	21		26-30	38,183	911	24
	31-35	254,633	9,658	38		31-35	22,950	1,094	48
	36-40	15,373	682	44		36-40	1,508	74	49
Negro	18-20	15,931	1,685	106	Negro	18-20	57	2	35
	21-25	117,819	22,588	202		21-25	1,636	175	107
	26-30	66,702	19,666	295		26-30	1,398	303	217
	31-35	42,451	15,190	358		31-35	952	287	302
	36-40	3,224	1,211	376		36-40	94	31	330
Other races	18-20	1,245	37	30	Other races	18-20	139	2	14
	21-25	41,198	1,044	25		21-25	9,425	188	20
	26-30	21,101	984	47		26-30	4,906	220	45
	31-35	12,282	990	81		31-35	2,807	197	70
	36-40	843	87	97		36-40	161	16	99
TOTAL all races	18-20	34,790	1,917	55	TOTAL all races	18-20	883	11	12
	21-25	1,106,793	33,309	30		21-25	74,058	1,013	14
	26-30	562,103	30,602	54		26-30	44,487	1,434	32
	31-35	309,366	25,838	84		31-35	26,709	1,578	59
	36-40	19,440	1,980	102		36-40	1,763	121	69
TOTAL (All ages)									
White		1,709,696	30,164	18	White		126,325	2,736	22
Negro		246,127	60,340	245	Negro		4,137	798	193
Other races		76,669	3,142	41	Other races		17,438	623	36
GRAND TOTAL: (All races, all ages)		2,032,492	93,646	46			147,900	4,157	28

*As compiled from reports of the U. S. Public Health Service.

cians or non-official clinics. Of the above mentioned 953 cases of which the health department had information, 565 cases, or 59%, were diagnosed as having syphilis and had no previous knowledge of the disease. Only 56 cases, or 7% of the 794 who reported to the health department, were found not to have syphilis after a thorough study of their cases. It is of importance to note that the incidence of positive spinal fluid examinations in this group was high.

Cost of Syphilis

IT IS ESTIMATED that there were some 13 million industrial workers employed in the United States in December 1942;[16] an average of $6.30 a day was paid these men. About 1½ days per man are lost to industry each year as a result of venereal diseases.[17] Therefore, wages lost to the industrial worker himself, excluding the cost to industry, thus amounts to an average annual loss of $123,000,000. The U. S. Department of Labor reports[16] 39 million persons, exclusive of farm employees, were employed in 1942. If a basis of $5 a day is used as their average wage, venereal disease cost this group $293,000,000 last year. The California State Department of Labor[18] reports that 1,032,000 industrial workers were employed in California January, 1943, at an average daily wage of $8. An absence from work of 1½ days a year for men in this group, due to venereal disease, represents an annual loss of $12,400,000. In addition to these figures, conservative estimates place the national cost of care of the syphilitic insane at $31,000,000[17] and the care of the syphilitic blind at $10,000,000.[19] These are staggering.

The disease decreases the life expectancy by approximately one-fourth, frequently adding an increased tax burden to the public to care for those families left without means of support.

Conclusion

SYPHILIS is one of the most prevalent of the communicable diseases. Industrial serologic surveys do not usually find syphilis in the infectious stage, but they play an important part in finding unknown and untreated latent and late syphilis.

Industry is not justified in considering the presence of syphilis in an employee under treatment or adequately treated as a cause for discharge from employment. Such an attitude is detrimental to the war effort, a hindrance to progressive industrial venereal disease control, and leads to plant management-labor union conflict. Latent syphilis is not a danger to industry. It is neurosyphilis and cardiovascular syphilis, and results of latent syphilis, which present the potential industrial hazard.

The health department and not industry or labor unions must assume the responsibility for requiring adequate treatment of the known untreated or inadequately treated syphilitic industrial worker. Only those workers who are not amenable to, or who do not respond sastisfactorily to, adequate treatment should be placed in new occupations commensurate with their physical condition.

Venereal disease case finding and case holding can be best managed by the health department as an unbiased official agency legally responsible for these activities. In addition to case finding and case holding, industrial venereal disease control should include education of plant management as well as the industrial employee. Adequate venereal disease education requires the coordination of all agencies concerned so as to present a unified effort.

In the San Francisco area 28 out of every thousand industrial employees examined are found to have unknown and untreated syphilis. It is important to in-

dustry and society that these cases be discovered and treated. The finding of these unknown cases of syphilis with subsequent provision for complete treatment results in great financial saving to industry and society, not only by avoiding industrial accidents, but also by providing more productive workers and prolonging their lives.

It is the function of the public health department to find syphilis in industry and the responsibility of the physician adequately to treat it.

Summary

THE value of education and serologic surveys for discovery of syphilis in industry is discussed.

2. The public health and clinical aspects of venereal disease control in industry are noted.

3. The importance of a non-discriminatory attitude towards the syphilitic worker is emphasized.

4. The incidence of syphilis in reference to age, race, and occupation is statistically enumerated.

5. The cost of syphilis is evaluated.

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American Association of Industrial Physicians and Surgeons

—Second "War Conference"—St. Louis, May 9-14, 1944—

THE SECOND "War Conference" on Industrial Medicine, meeting at Hotel Jefferson, St. Louis, Missouri, May 9 to 14, 1944, will include industrial medicine and surgery, industrial hygiene, industrial nursing, and industrial dentistry. The participating organizations are:

AMERICAN ASSOCIATION OF INDUSTRIAL PHYSICIANS AND SURGEONS.

AMERICAN INDUSTRIAL HYGIENE ASSOCIATION.

NATIONAL CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS.

AMERICAN ASSOCIATION OF INDUSTRIAL NURSES.

AMERICAN ASSOCIATION OF INDUSTRIAL DENTISTS.

THE NATIONAL CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS has its program throughout Tuesday.

The AMERICAN INDUSTRIAL HYGIENE ASSOCIATION will devote all day Wednesday and Thursday morning to its own sessions, and will hold a joint meeting with the industrial physicians during Thursday afternoon.

The AMERICAN ASSOCIATION OF INDUSTRIAL PHYSICIANS AND SURGEONS begins its meetings Wednesday, with Medical Clinics at Desloge Hospital in the morning; opening its annual meeting session in the afternoon; continuing on Thursday with Surgical Clinics at Barnes Hospital in the morning, a joint session with the AMERICAN INDUSTRIAL HYGIENE ASSOCIATION in the afternoon, and the Annual Dinner in the evening; resuming its own meeting Friday morning, and closing with a joint session with the AMERICAN ASSOCIATION OF INDUSTRIAL NURSES in the afternoon.

The AMERICAN ASSOCIATION OF INDUSTRIAL NURSES begins its own sessions Saturday, continuing throughout the day, and closing with a Sunday program to be arranged by the St. Louis Industrial Nurses' Club.

The AMERICAN ASSOCIATION OF INDUSTRIAL DENTISTS will hold its conference on industrial dental health during the afternoon of Thursday, May 11.

All sessions excepting the Medical and Surgical Clinics will be held at Hotel Jefferson.

The program, tentative in so far as it may be subject to last-minute changes, is as given here.

A Conference feature will be the very unusual dis-

National Conference of Governmental Industrial Hygienists

Tuesday Morning, May 9

PRESIDING: PAUL A. BREHM, M.D.

Worker Health Education—A Symposium

"The Federal Government's Responsibility"—ELNA I. PERKINS, Associate Health Education Specialist, Division of Industrial Hygiene, U. S. Public Health Service.

"The State's Responsibility"—WM. G. HAZARD, Acting Chief, Industrial Hygiene Service, New Jersey Department of Health; HERBERT T. WALWORTH, Chief Industrial Hygiene Engineer, Division of Preventable Diseases, Tennessee Department of Public Health; JOAN Y. ZIANO, R.N., Nursing Consultant, Division of Industrial Hygiene, Illinois Department of Public Health.

"The Employer's Responsibility" — ANDREW FLETCHER, Vice-President and Treasurer, St. Joseph Lead Company.

"The Labor Union's Responsibility" — LEO PRICE, M.D., Medical Consultant, International Ladies' Garment Workers Union.

Tuesday Afternoon, May 9

PRESIDING: PAUL A. BREHM, M.D.

Round Table Discussion:

"To What Extent Should Official Findings Relative to Plant Conditions Be Made Available to the Worker?"—Led by KENNETH E. MARKUSON, M.D., Director, Bureau of Industrial Hygiene, Michigan Department of Health.

Round Table Discussion:

"The Pros and Cons of Standardization"

"In Field and Laboratory Procedure"—Led by ROBERT M. BROWN, Supervisor, Industrial Hygiene Service, St. Louis City Health Division.

"In Record Keeping and Reports"—Led by VICTORIA M. TRASKO, Assistant Statistician, Division of Industrial Hygiene, U. S. Public Health Service.

"In Setting Threshold Limits"—Led by MANFRED BOWDITCH, Director, Division of Occupational Hygiene, Massachusetts Department of Labor and Industries.

"The Interest of the War Production Board in Industrial Health"—JOHN M. FEWKES, Chief, Industrial Health and Safety Section, Office of Labor Production, War Production Board.

"The Coordination of Federal and State Industrial Nutrition Programs"—ROBERT S. GOODHART, M.D., Chief, Nutrition in Industry Division, War Food Administration, U. S. Department of Agriculture, Washington, D. C.

"A Cooperative Shipyard Study by the Public Health Service and the Maritime Commission"—WALDEMAR C. DREESSEN, M.D., Chief, Medical Unit, Division of Industrial Hygiene, U. S. Public Health Service.

American Industrial Hygiene Association

Wednesday Morning, May 10

PRESIDING: H. H. SCHRENK, PH.D.

"Industrial Hygiene in the Synthesis of Rubber: Further Data"—FREDERICK S. MALETTE, Industrial Hygienist, The Firestone Tire & Rubber Company, Akron, Ohio.

"A Report on the Quartz Crystal Industry"—HARRY F. SCHULTE, Director, Kansas City Area Industrial Hygiene Service, Kansas City, Missouri.

"The Control of Excessive Heat and Humidity in Industry; Putting Theory into Practice"—JOHN B. SKINNER and WILLIAM M. PIERCE, Division of Occupational Hygiene, Massachusetts Department of Labor and Industries, Boston.

"Industrial Health Hazards and Their Control in a Bomb Loading Plant"—Engineering Unit, Industrial Hygiene Division, U. S. Public Health Service, Bethesda, Maryland.

"The Radon/Carbon Dioxide Ratio as an Index to Excessive Radium Absorption"—FRANK E. HOECKER, PH.D., Senior Physicist, Field Operations Section, Industrial Hygiene Division, U. S. Public Health Service, Bethesda, Maryland.

Wednesday Afternoon, May 10

PRESIDING: J. J. BLOOMFIELD.

"Newer Developments in Air Sampling: I. A Modified Beaded Column for Absorbing Gases and Mists. II. The Estimation and Significance of Cutting Oil Mists in the Atmosphere"—J. BRENNAN GISCLARD, Chief Chemist, Bureau of Industrial Hygiene, Michigan Department of Health, Lansing, Michigan.

"The Absolute Efficiency of the Impinger and the Electrostatic Precipitator in the Sampling of Air Containing Metallic Lead Fumes"—ROBERT G. KEENAN and LAWRENCE T. FAIRHALL, PH.D., Industrial Research Laboratory, National Institute of Health, U. S. Public Health Service, Bethesda.

"The Significance of Absorbed Radium as Determined from the Coefficient of Elimination"—FRANK E. HOECKER, PH.D., Senior Physicist, Field Operations Section, Industrial Hygiene Division, U. S. Public Health Service, Bethesda.

"The Place of Range Finding Tests in Investigations of Industrial Toxicology"—HENRY F. SMYTH, JR., PH. D., Senior Industrial Fellow, Mellon Institute of Industrial Research, University of Pittsburgh.

"The Toxicity and Potential Dangers of Methylene Dichloride"—LEON HEPPEL, M.D., Industrial Research Laboratory, National Institute of Health, U. S. Public Health Service, Bethesda.

Thursday Morning, May 11

PRESIDING: PHILIP DRINKER, PH.D.

"Studies on the Toxicity and Potential Dangers of TNT"—WOLFGANG F. VON OETTINGEN, M.D., Industrial Research Laboratory, National Institute of Health, U. S. Public Health Service, Bethesda.

"Effect of TNT on the Formed Elements of the Blood"—LIEUT. THOMAS E. CONE, JR., USNR, U. S. Naval Mine Depot, Yorktown, Virginia.

"Industrial Cadmium Poisoning: Report of Five Cases, Including One Death"—LOUIS W. SPOLYAR, M.D., JOHN F. KEPPLER, and H. G. PORTER, Division of Industrial Hygiene, Indiana Board of Health, Indianapolis, Indiana.

"Health Hazards in Soldering Operations"—JAMES CROSSER, JR., A. M. NOYES, and G. W. DAUBENSPECK, Division of Industrial Hygiene, Illinois State Department of Labor, Chicago.

"Exposure of Animals for Brief Periods Eight Times Daily to High Concentrations of Methanol Vapor in Air"—ROYD R. SAYERS, M.D., Director, Bureau of Mines, U. S. Department of the Interior, Washington, D. C.; WILLIAM P. YANT, SC.D., Director of Research and Development, Mine Safety Appliances Company, Pittsburgh, Pennsylvania; HELMUTH H. SCHRENK, PH.D., and S. J. PEARCE, Central Experiment Station, U. S. Bureau of Mines, Pittsburgh.

"Donald E. Cummings Memorial Lecture"—LEROY U. GARDNER, M.D., Saranac Laboratory for the Study of Tuberculosis, Saranac Lake, New York.

American Association of Industrial Physicians and Surgeons

Wednesday Morning, May 10

MEDICAL Clinics—Firmin Desloge Hospital, DR. CHARLES HUGH NEILSON, Chairman.

The Electro-Magnet in Eye Injuries.
Minimal Tuberculosis in Employment.
Blood Substitutes in Trauma.
Methods of Hastening Wound Healing.
Medical Misbehavior of Patients.
Backache as an Industrial Problem.
The Prevention of Oil Dermatoses.
Peripheral Nerve Injury in Industry.
Clinical Management of an Influenza Epidemic.
Traumatic Injury of the Lungs.

Wednesday Afternoon, May 10

PRESIDENT'S Address—HARVEY BARTLE, M.D.

DR. BARTLE, presiding:

"The Industrial Physicians' Opportunity to Advance Medical Knowledge"—DR. FRED J. WAMPLER, Professor Preventive Medicine and Industrial Medicine, Medical College of Virginia.

Discussion: DR. CHRISTOPHER LEGGO; DR. H. GLEN GARDINER.

DR. M. N. NEWQUIST, Chairman.

"Extended Medical and Hospital Service in Industry." (Postwar Plans, Wagner Bill, etc.):

DR. SIDNEY R. GARFIELD.
DR. R. M. KLEMME.
MR. ROBERT WATT (A.F. of L.)
MR. J. DEWEY DORSETT.

Thursday Morning, May 11

SURGICAL Clinics—Barnes Hospital, DR. EVARTS A. GRAHAM and staff.

Compound fractures.
Low back injuries.
Biochemical changes in acute burns.
Local treatment of burns.
Reconstruction following third degree burns.
Cranio-cerebral injuries.

Thursday Afternoon, May 11

JOINT Session AMERICAN ASSOCIATION OF INDUSTRIAL PHYSICIANS AND SURGEONS and AMERICAN INDUSTRIAL HYGIENE ASSOCIATION. FREDERICK W. SLOBE, M.D., and ROBERT A. KEHOE, M.D., co-chairmen.

Welding: (1) "Pulmonary Findings in Welders"—O. A. SANDER, M.D., Milwaukee, Wisconsin. (2) "Welding Fumes in Steel Fabrication"—PHILIP DRINKER, PH.D., Boston, Massachusetts; "Control of Welding Fumes"—LT. F. VILES (USNR, U.S. Navy Yard, Boston, Massachusetts). Discussion: DR. A. G. CRANCH, New York City.

Noise: (1) Medical Phases: "Iudustrial Noise"—DAVID A. MCCOY, M.D., Medical Director, Division of Industrial Medicine, Liberty Mutual Insurance Company, Boston, Massachusetts. (2) Prevention: "The Control of Industrial Noise"—ALLEN WILSON, Acoustical Department, Celotex Corporation, Chicago.

"Medical Control Program of Solvent Exposures in a Coke By-Product Industry"—HAROLD STEINBERG, M.D., Medical Director, Peoples Gas Light and Coke Company, Chicago, Illinois.

Thursday Evening, May 11

ANNUAL DINNER: Presentation of the KNUDSEN AWARD. Speaker to be announced.

Friday Morning, May 12

PRESIDING: DR. FENN E. POOLE.

"Dental Manifestations in Occupational Diseases"—B. G. SARNAT, D.D.S., St. Louis, Missouri.

"Re-Employment and Rehabilitation of Veterans"—COLONEL JOHN ANDREWS.

Discussion—DR. RICHARD P. BELL, DR. H. A. VONACHEN.

Group Discussions: (running concurrently):

"Better Health in Small Industrial Plants"—DR. FRANK T. MCCORMICK.

Discussion—DR. CHARLES-FRANCIS LONG.

"Who Can Work"?—DR. JOHN J. WITTMER:

Heart: DR. MACK M. SHAFER, Frigidaire Division of General Motors;

Eyes, Chest: DR. F. B. WISHARD, Delco Appliance Division, General Motors;

Mental, Epileptics: DR. G. A. EADIE, Eastern Aircraft Corporation.

Friday Afternoon, May 12

JOINT SESSION—AMERICAN ASSOCIATION OF INDUSTRIAL PHYSICIANS AND SURGEONS with AMERICAN ASSOCIATION OF INDUSTRIAL NURSES.

"Women in Industry"—DR. HENRY S. BROWN, Chairman.

(a) Job Placement—DR. G. H. GEHRMANN, Wilmington, Delaware;

(b) Absenteeism—All Causes—DR. C. O. SAPPINGTON, Chicago;

(c) Psychological Aspects of Training and Integrating Women Who Have Never Done Factory Work—DR. W. A. SAWYER, Rochester, New York.

(d) Handling of Pregnancies and Dysmenorrhea—MISS CAROLINE G. OLSON, R.N.;

(e) Care, Supervision, Counsel.

"Health Promotion in Industry"—(a) Industrial Physician (covered by DR. MCCORMICK, in "Better Health in Small Industries," Thursday afternoon session). (b) Management—ROBERT L. LUND, Pharmaceutal Co., St. Louis. (c) Industrial Nurse—MARGARET SHEPPARD, R.N., Dow Chemical Co., Midland, Michigan.

Discussion—NORMA WHITE, R.N., President New England Industrial Nurses Club, Hartford, Connecticut.

Nurses' Sessions: (running concurrently)

"Post War Plans for Medical and Nursing Services for the Benefit of Industry"—10-minute papers to be presented by: (1) An Industrial Physician; (2) EILEEN MCCARTHY, R.N., Budd Mfg. Co., Philadelphia; (3) An Executive from industry; (4) An Industrial Relations Manager.

Discussion—MISS MARY DELEHANTY, R.N., President, New York Club, Equitable Life Assurance Company, New York City.

American Association of Industrial Nurses

Saturday, May 13

GENERAL Business Session—MISS CATHERINE DEMPSEY, President, presiding—Simplex Wire and Cable Company, Cambridge, Mass.

Luncheon Meeting ($2.50 includes tax and tip).

Greetings — HENRY S. CAULFIELD — Director Public Welfare, St. Louis; MILDRED O'CONNELL, R.N., President, St. Louis Industrial Nurses' Club.

Round Table—MRS. MARGARET LUCAL, R.N., presiding—Ohio Rubber Co., Willoughby, Ohio.

1. "Problems of the Young Nurse in Industry"—by DEMARIS URBANEK, R.N., Oak Mfg. Co., Chicago, Illinois.
2. "The Industrial Nurse's Part in the Rehabilitation of Psychiatric Problems"—by CHRISTINE SUKULA, R.N., Weirton Steel Co., Weirton, W. Va.
3. "Individual Nursing and Leadership"—by RUTH EISERMANN, R.N., Diesel Engine Div, General Motors Corporation, Cleveland, Ohio.
4. "Nursing Ethics in Industry"—by ISABEL COMSTOCK, R.N., Boeing Aircraft Corp., Seattle, Washington.
5. "War Time Problems in Industrial Health"—CHARLES A. SCHNEIDER, R.N., Kaiser Ship Yards—San Francisco, California.

Ten-minute papers followed by fifteen-minute discussion on each paper.

Saturday Evening, May 13

DINNER Meeting ($4.00 including tax and tip — Dress optional). CATHERINE R. DEMPSEY, R.N., President, presiding.

(Introduction of newly elected officers and Board members).

Invocation—

Toastmaster: DR. ROLAND M. KLEMME, Neuro Surgeon, St. Louis-San Francisco Ry.

Speakers: DR. WAYNE L. RITTER, Asst. Director, Division Industrial Hygiene, Jackson, Mississippi—"Trends in Industrial Nursing."

DR. A. C. DICK, Medical Director, Consolidated Vultee Aircraft Corporation, San Diego, California.

Sunday, May 14

PROGRAM to be arranged by St. Louis Industrial Nurses' Club.

Breakfast ($1.25 includes tax and tip).

play of technical exhibits—more important than ever before in that the exhibits this year reflect the newest and latest developments in medicine and surgery in a period when these developments are so numerous and so significant and valuable that much can be learned from their study. The meeting schedules have been arranged to allow almost as much time for visiting the exhibit rooms as for attending the meetings.

All five of the participating organizations will join in the Annual Dinner, Thursday evening, at which the annual presentation of the WILLIAM S. KNUDSEN Award will be made.

Arsine, Stibine, and Hydrogen Sulfide

—Accidental Industrial Poisoning by a Mixture—

CARL A. NAU, M.D.,
WILLIAM ANDERSON, M.D., and R. E. CONE, M.D.,
Galveston, Texas

IT IS POSSIBLE accidentally to change potentially safe procedures to unsafe procedures in an effort to speed up operations or to make them less objectionable objectively.

The potential toxicity of arsine and hydrogen sulfide are known and adequately described.[1,2] The literature, however, gives little information on the toxicity of stibine. Henderson and Haggard[3] in their excellent book, "Noxious Gases," make no reference to it. It is generally understood, however, that the physiological responses to exposure to arsine and stibine are identical and that both are equally toxic. The ease of production and the unforeseen and unexpected circumstances are little appreciated.

We have recently observed and treated three workers poisoned by a mixture of these three gases. All recovered. It is believed that a report of our observations will emphasize the potency of such toxic gases which may be accidentally and unexpectedly produced in industrial operations.

The gases were liberated when water was added to a hot dross containing metallic aluminum and compounds of arsenic and antimony; and free sulfur. The nascent hydrogen liberated combined with these metals to form arsine, stibine and hydrogen sulfide as described in the paper "The Accidental Generation of Arsine, Stibine, and Hydrogen Sulfide in a Metal Refinery."[4]

PATIENT 1. On Wednesday morning at 8:00 A.M., November 10, 1943, colored employee No. 1 started to "water down" hot dross in an effort to "speed up operations" and "settle the black dust." He used a garden hose and water supply which first became available that morning. By 9:00 A.M. of that same day, a white man, age 36, who worked on the kettles from which the dross was removed—moving about the platform adjacent to where the water was added to the dross and occasionally coming near the dross—became ill enough to stop work, complaining of headache, marked weakness, nausea, severe abdominal and lumbar pain. He drove his car home and went to bed. But by 11:00 A.M. he felt so much worse that he had his wife drive him back 15 miles to a physician. He noticed that his urine was "bloody" and that he was "turning yellow." The physician did not reveal his diagnosis but gave the patient 1000 cc. of 10% intravenous glucose on each of three successive days.

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On November 15, the company nurse visited the employee's home and advised him to go to the hospital. His chief complaints[5] on admission to the hospital were weakness, nausea, vomiting, headache, lumbar and abdominal pain, slight cough and jaundice. His urine, when admitted, was essentially negative except for one or two pus cells per high power field and a few squamous and epithelial cells. His icteric index was one and the coagulation time four minutes. The white cell count and differential counts were not significant. On November 20, 1943, basophilic aggregation cells, according to McCord's technique, comprised 3% of the red blood cells.[6,7] The red cell count and hemoglobin per cent were as follows:[8]

	Count		Hemoglobin
11/16/43	2,390,000		42
		500 cc. blood } Intravenous transfusion	
		500 cc. saline }	
11/17/43	2,710,000		55
11/18/43	3,700,000		76
		500 cc. blood } Intravenous transfusion	
		500 cc. saline }	
11/19/43	4,020,000		74
11/20/43	4,100,000		75
11/22/43	4,120,000		81
11/23/43	4,410,000		86
11/24/43	4,250,000		85

TREATMENT—PATIENT 1[9]

1. 1000 cc. 10% intravenous glucose each day from November 10, 1943, to November 24, 1943, except on the days when he received a blood transfusion.
2. Blood transfusions as indicated.
3. Ferrous sulfate—III to VI grains per day.
4. As much liquid as he would take.
5. Symptomatic.

The patient was dismissed from the hospital on November 25, 1943, but has complained frequently (both during and after hospitalization) of a ringing in one (same) ear. He feels well and went back to work December 13, 1943.

PATIENT 2. Negro, male, age 29, married, with one child. On Tuesday afternoon November 9, 1943, shortly before 5:00 P.M. this employee "watered down" a batch of dross for only a few minutes before he "checked out" at the end of the shift. On Wednesday morning November 10, 1943, shortly before 8:00 A.M. he and Patient 3 alternately "watered" the dross as it was brought to them in large metal buckets. He states that as the water was added there was a large evolution of musty gas, irritating his eyes, nose and throat; and also the production of a spontaneous yellow or blue flame.

When he "urinated" at noon he noticed that his urine was "nearly black." He continued to work, however, until he developed rather severe abdominal and back pains, weakness, nausea and vomiting (green-black vomitus). By 3:00 P.M. he felt so badly that he stopped work. At the dressing quarters he again noticed that his urine was "bloody" or "black." In addition to the symptoms listed, he developed a severe headache. His urine continued to be black at home. The next morning he reported to the first aid department who sent him to the plant physician. He was admitted to the hospital November 12.

Physical Examination on Admission: A colored male, weight 178 lbs., well nourished, very weak, nauseated and vomiting frequently. At first the vomitus was black and later green. Jaundice was striking. All other findings were essentially negative except for tenderness over the lumbar area.

Fluids were pushed. Intravenous glucose and blood transfusions were ordered: ferrous sulfate and crude liver extract were prescribed. The laboratory findings and progress may be summarized as follows:

Urine:

11/12/43—essentially negative except for 1 or 2 pus cells and 2 or 3 granular casts per each high power field. The occult blood test was 4 plus and that for bilirubin was negative.

White Blood Cell:

11/12/43—	Count	14,850	
	Differential—	Polymorphonuclears	88
		Lymphocytes	10
		Monocytes	2
12/7/43 —	Count	5,250	
	Differential—	Polymorphonuclears	68
		Lymphocytes	10
		Monocytes	2

Icteric Index:

11/13/43	80
11/20/43	4

Coagulation Time:

11/22/43	4 min.

Blood Chemistry:

12/4/43	Blood NPN—34 mgm.
	Blood urea nitrogen—15 mgm.

Kidney Function Test—PSP

12/4/43	1st hour—40% clearance
	2nd hour—25% clearance
11/20/43	Basophilic aggregation cells
	7% of red cells

Water Balance:

	Intake (12 hrs.)	Output (12 hrs.)
11/12/43	720	300
11/12/43	1020	850
11/13/43	420	400
11/13/43	660	350
11/14/43	1880	1600
11/14/43	1100	1230
11/15/43	1770	1800
11/15/43	1050	650
11/16/43	1450	1100
11/16/43	2350	1410

Red Blood Cell and Hemoglobin Changes:

Date	RBC Count	% Hemoglobin	Transfusion of Blood
11/12	2,390,000	58	
11/13	2,140,000	46	
11/14	1,850,000	38	(450 blood (450 saline
11/15	2,100,000	40	
11/16	2,070,000	38	(200 blood (200 saline
11/17	2,550,000	50	
11/18	2,360,000	48	
11/19	3,024,000	63	(500 blood (500 saline
11/20	3,630,000	64	
11/22	3,250,000	65	
11/23	3,520,000	64	
11/27	3,690,000	68	
11/30	3,750,000	79	
12/2	3,840,000		
12/4	3,580,000	70	
12/7	3,710,000	70	

TREATMENT:

1. Intravenous glucose (5%) up to 1500 cc. each day except for the days when blood was given intravenously.
2. Transfusions of blood.
3. Ferrous sulfate—3 to 6 grains per day.
4. As much liquids as the patient would take.
5. Crude liver extract (2 units) three times a week beginning 11/28/43.

The red cell count is still low and the patient complains of frequent ringing in one ear. It should be added that he was honorably discharged from the army a few months ago with a certificate of disability for (1) myocardial insufficiency, cause undetermined; (2) arterial hypertension, mild; cause undetermined.

PATIENT 3. Negro male, age 28, married. History of exposure is essentially that of Patient 2. He, however, worked the entire day of November 10 even though he felt weak, nauseated, and had headache and abdominal and back pain.

The history, symptoms and physical findings upon admission to the hospital on November 12, 1943, were essentially identical to those of Patient 2.

Laboratory Findings:

Urine:—findings identical to those in urine of Patient 2.

White Blood Cell:

11/12	Count	8,900	
	Differential—	Polymorphonuclears	77
		Lymphocytes	22
		Monocytes	1
11/16	Count	4,400	
	Differential—	Polymorphonuclears	74
		Lymphocytes	24
		Monocytes	2

Icteric Index:

11/13/43	30
11/20/43	7

Coagulation Time:

11/20/43	3 minutes
11/20/43	Basophilic aggregation cells
	2½% of red cells

Water Balance:

	Intake (12 hours)	Output (12 hours)
11/13/43	990	910
11/14/43	840	800

Red Blood Cell and Hemoglobin Changes:

Date	RBC Count	Hemoglobin %	Transfusion
11/12/43	4,710,000	95	
11/13/43	3,720,000	76	
11/14/43	3,640,000	75	
11/16/43	3,210,000	67	
11/17/43	3,140,000	61	500 blood 500 saline
11/18/43	3,810,000	80	
11/19/43	3,760,000	82	
11/20/43	3,640,000	84	
11/22/43	4,340,000	87	
11/23/43	4,270,000	85	
11/24/43	3,900,000	78	
11/26/43	3,900,000	82	
11/27/43	3,970,000	78	
11/30/43	4,490,000	89	

Treatment was essentially the same as that for Patients 1 and 2.

This patient, too, still complains of a ringing sound (dull) in one ear (the same ear).

Conclusions

TOXIC and hazardous exposures may occur accidentally and go undiagnosed if the nature of the operations and potential reactions is not understood.

2. The hemolytic effect is the most outstanding finding resulting from exposure to the mixture of gases encountered.

3. The specific phenomena of chronic poisoning are to be studied.

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Human Behaviour

—And its Relation to Industry—

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THERE are so many points in common between industrial medicine, nursing, industrial relations and personnel work that what I may say about doctors and nurses applies with equal force to personnel workers, social service workers and others who are interested in the human element in industry. The interests shared between the industrial medical department and the industrial relations department are particularly striking. They are both concerned primarily with the human element of industry; the industrial medical department with the physical and mental health of the worker; the industrial relations department with the general well-being and the promotion of contentment among the workers and satisfactory relations between employer and worker. Both departments are concerned with the supervision of working conditions. Both departments are factors in building and maintaining plant morale. Both departments share the distinction of being purely advisory in their functions, advisory both to management and to workers. They have no authority to hire, fire, or order employees to do this or that.

It is this fact which gives us a unique and privileged position in industry. It enables us to share the confidence of both employer and worker, and, in many cases, to act as a buffer or interpreter between these two groups. The need for complete cooperation between the medical and industrial relations departments in their daily work is of prime importance, for they are complementary to each other and their functions should mesh smoothly and easily.

As an example of such cooperation, I might cite the case of a young man who was employed in the stores department of his company. It was a light job and he was doing well at it, so well, in fact, that in making a survey of personnel for promotion, the industrial relations department considered him as an "up and coming" young man and was about to recommend him for work entailing greater responsibility. Fortunately, before making this recommendation, the doctor was consulted, and he pointed out that the man in question was suffering from the effects of an old rheumatic endocarditis and for that very reason had been assigned to this particular job. The proposed promotion entailed not only greater responsibility but greater physical activity, and there is no doubt that had his work been so changed, he would have suffered a serious breakdown.

Another instance is that of the man who applied to the industrial relations department of his company for a loan. On enquiry, it was found that his wife had left him and that he wanted this loan to care for his three small children. On referring him to the doctor it was discovered that this employee was a man of very low mental calibre and was quite irresponsible—that was one reason his wife left him. Furthermore, he had already borrowed from many of his friends and relatives, one of whom was on the point of suing him to recover a loan. Now here was a case where a loan was not the answer to the problem. With the help of the medical department, the children were placed in an institution and the father, relieved of his family responsibility, was enabled to carry on.

The history of industrial medicine may be traced back as far as Greek and Roman times. Aristotle recorded information regarding diseases of runners and also prescribed a diet for gladiators. Plato noticed certain postural deformities among artisans. Pliny referred to the dangers caused by the handling of sulphur and zinc, and, in his Natural History, makes mention of masks made of transparent bladders which were used by workers to protect themselves from metallic dust during the preparation of vermilion.[1] There are other references to similar observations and procedures in ancient times, but the history of industrial medicine, as we know it, is comparatively short. Beginning about the turn of the present century, the greatest advance has been made during the past 25 years. It is only within the past 10 years that industrial nursing has reached its greatest development. Very recently, the American Medical Association has officially recognized industrial practice as one of the specialties. The American Association of Industrial Physicians and Surgeons has appointed a committee on qualifications for industrial medicine and surgery to work in conjunction with a similar committee representing the Section on Preventive and Industrial Medicine and Public Health of the American Medical Association.

The course of industrial medicine in Canada has been similar, although, to date we have not reached the same stage of organization within the profession that has been arrived at in the United States.

Industrial Medicine as a Specialty

AT THIS point, we may well ask how industrial medicine differs from any other type of medical practice, and what special knowledge an industrial physician and surgeon requires to qualify as a specialist in this field?

I think that the greatest single difference between the physician in private practice and the industrial physician is that in the case of the industrial physician, the company is his patient and not the individual. By "the company" I do not mean the shareholders, or the board of directors, or the executives, or his office workers or day labourers. The company, in this case, is the whole industrial and social organization of which the individual worker is a part. When I say that the company is his patient, it does not mean for a moment that the doctor must neglect the individual, or consider the company at the expense of the individual. It does not mean that he should be recognized as "the company doctor" with the implication of bias in favour of management which such a title may suggest. But it does mean that just as the surgeon must treat a broken leg or the physician cure a digestive upset in order to cure the individual, so the industrial physician must treat the individual in his relation to the company and the health and well-being of the company as a whole. He must always consider the well-being of the individual in its rela-

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tion to the whole organization. In extreme cases it may be necessary to "amputate" or "extract" a diseased or maladjusted individual for the good of the other employees of the company, but just as a radical operation is deferred as long as it is safe to do so, so every effort should be made to rehabilitate the individual before recommending his discharge. In accomplishing this objective, that is, treating the company as a patient, it is essential that the industrial physician must maintain a completely unbiased attitude, he must be absolutely fair and honest with the worker, with the company and himself.

As the doctor practicing preventive medicine tries to keep his patient healthy and vigorous, in the same sense the objective of the industrial physician is to maintain, as far as possible, a healthy, vigorous whole organization from the president to the sweeper. Some companies go so far as to maintain a so-called physiotherapy or health department, a reconditioning department, upon which the industrial physician must keep an eye. I know of one company in which the president is rather hipped on this idea. He is an elderly man and has made physiotherapy almost a fetish. He has installed such a department in his company and because the president thinks the treatment is good, he forces all his executives to take treatment. Incidentally, I may say that the executives do not grumble too much because this department is frequently used in order to get rid of a bad "hangover"! However, there is something in the basic idea and it is hoped that further research will develop the ethical side of this phase of preventive medicine to assist in maintaining the health of key executives and, of course, the rank and file of the working force.

In this connection it might be well to make this statement: Clearer knowledge and further development in the industrial field can come only as the result of the trained observation and accurate analysis of the industrial physician being directed upon the actual working conditions on the plant floor. An industrial physician recently stated that the doctor in industry should spend more time going through the plant than he does answering the telephone or handing out prescriptions.

The special qualifications required of an industrial physician, have been stated by McCord[2]:

1. The industrial physician should have some experience in general practice in order that he may know man and his foibles.

2. He should have a knowledge of medical practice, not necessarily profound, of the fundamentals of industrial relations, of applied preventive medicine, of occupational diseases, of psychopathic medical investigations, of recreation, and of accidental prevention methods.

3. He should have a knowledge of the special problems relating to the employment of women and children; some knowledge of pensions and insurance, including liability and group; some knowledge of plant organization, which is likely to prove effective in dealing with the problems of labour.

4. He should have a knowledge of employment methods; some notion of job analysis, physical and mental tests to determine the fitness of applicants; a knowledge of race problems, industrial training, apprenticeship, continuation schools for training in particular jobs, and at least some knowledge in relation to the cost of living according to the local standards.

5. He should have knowledge of the hours of work in relation to fatigue and output; knowledge of shift systems, rest periods, regularity, absenteeism, turnover and its cost.

6. He should have at least a superficial knowledge of security and continuity of employment in slack seasons, while convalescing from accident or disease, in case of labour-saving improvements, as well as with the advent of old age.

7. He should have a general knowledge of physical working conditions, safeguards, disagreeable gases and dusts, heating, lighting, ventilation, locker rooms, wash rooms, rest rooms, restaurants, hospitals, laundries, toilets, showers, plant beautification, drinking water, etc.

8. He should be qualified to carry out physical examinations of applicants, and periodic re-examinations of employees.

9. He should have very definite knowledge of housing, transportation, recreational and educational facilities; and the transfer and replacement of misfits—how to "fit the round peg into the round hole."

10. He should be familiar with follow-up work, especially among new employees and with the injured; and familiar with the replacement of injured and crippled employees.

From the foregoing, it will be seen that the individual physician must possess a knowledge of a great many subjects which do not come within the range of or particularly interest the doctor in private practice. Many of these subjects are not even touched upon in the ordinary medical course.

Nursing in Industry

WE MAY also ask how industrial nursing differs from other nursing, in particular, nursing in our hospitals? In the course of a nurse's training in a hospital and in her subsequent work, certain routines are followed. These have been established over a period of years to suit the needs of the hospital and the patient in the hospital. They are helpful to the nurse as well as the patient, and are necessary for the efficient operation of a hospital institution.

Industry also has its routines, which are directed toward production, plant and machinery maintenance, selling, etc., and their object is to get things done at a certain cost. Nurses entering industry experience a very definite conflict between the routines of the hospital and those of industry. Quite frequently, industrial routines seem to tear down those which nurses have been trained to follow. The industrial nurse, therefore, is called upon to blend hospital and industrial procedures. This is not as easy as it may appear on the surface. Nurses frequently resent the interference of industrial routine with that to which they have been trained. This resentment quite often brings about such an emotional disturbance as makes it impossible for the nurse to adjust herself to industry. Some of the qualifications, therefore, of an industrial nurse are that she must be open-minded, flexible and emotionally stable.

The relation between nurse and patient in industry is also quite different from that of the hospital. Patients are admitted to the hospital complete strangers to the nurses. In many cases, nurses get to know the patients personally during their stay in hospital and may even learn something of their background and home conditions, but it is seldom that after a patient is discharged from the hospital the nurse ever sees or hears of him again. In the case of industrial nursing, the nurse is acquainted with the patient before he is ill or injured, and after his illness this acquaintance is followed up and maintained.

The industrial nurse, in addition to knowing the patient, is required to know something of his family life and social background. While the nurse is always concerned with the attitude and emotional state of the patient, she is called upon in industry to go further than that. It is the desire of industrial management that the employees of a plant shall have confidence in the nurses, that each individual employee shall feel that the nurse is his friend in the little, but all important, things

so closely related to home life, family troubles, worries and fears. Industrial management has found that when employees feel that they can tell their troubles to the nurses, there are fewer grievances based on bitterness, worry and brooding. This implies that industrial nurses are called upon to employ, in addition to their technical skill, some of the simple fundamentals of psychiatry and psychology. Not only that, but the industrial nurse is even asked to give something of her maternal, sympathetic, friendly self to the solution of employees' personal problems.

It is quite natural, in view of the training of nurses, for the nurse to feel a professional and even a maternal interest in her patient and to utilize all factors and influences for the good of the patient only. As in the case of the doctor, industry requires another adjustment in this situation. The industrial nurse must be led to recognize the limitations of industry, the limitations of time and production demands. The care of her patient must be limited by these factors. As in the case of the industrial physician, the nurse must learn that the patient should be treated and cared for within certain time limits, within certain production demands. Production time schedules frequently interfere with clinic schedules. In hospital practice the nurse always has her patient available and treatment can be given when desired. In industry the clinic treatment must often be fitted in to suit the schedules of plant operations. In some cases the nurse may be forced to divide her day between time in the clinic and visits to employees in their homes. She must be gradually led to understand that her total object is not the patient but rather the maintenance and preservation of a healthy, efficient working force. In short, the nurse is required to care for the patient in relation to production efficiency and plant morale.

This adjustment is particularly significant since it involves quite frequently the question of the ethics of medicine. Industrial routines, are, in many instances, unfair to the patient. In such cases, the nurse must determine whether or not she must fight for the welfare of the patient. Her opinion, her professional knowledge, must frequently be her authority for demanding certain concessions on behalf of the patient by industrial management. This is particularly true in cases of rehabilitation after serious illness or serious accident. In the case of employees who are being rehabilitated after illness or accident, for instance, in the case of a man who has had an operation for hernia, industrial routine may not provide for giving him the type of work or the hours of work which he requires. In such a case, it is the duty of the nurse, under the direction of the doctor, to see that such an employee does not return to work too soon or until the routine of the plant can be modified to suit his requirements.

Importance of Personnel Selection

WHAT I have just said about doctors and nurses in industry applies in many respects with equal force to those engaged in industrial relations and personnel work. All jobs may be classified in two main groups, those which deal with things, and those that deal with people. Engineers have brought to industry a realization and an appreciation of machine design and construction. Great care is exercised on the part of the management before large sums of money are spent for certain types of machines. Because of this realization, management, particularly technical management, spends much time in determining whether or not it will buy a certain machine. Management does not apply this kind of thinking to the employment of human beings. There are some companies, and, I regret to say, a large number of such companies, who regard the hiring and performance of labour as a cheap commodity. They labour under the idea that human beings can be readily replaced, but expensive machinery cannot be so easily replaced. The management therefore, concentrates its analysis and consideration on the machine and pays little attention to the proper assignment of the human being to the job. It is the task of the industrial physician, the psychologist, the psychiatrist, so to educate management that it will realize the significance of such factors as monotony, fatigue, temperature, ventilation, lighting, machine painting and working equipment as related to the adjustment, the cooperation and the job performance of the individual.

An excellent example of this type was the case of a woman, Bertha, who was employed in a large factory making tin cans. Her job was on one of the processing machines. She was a powerfully-built girl and was an excellent worker but had gained the reputation for being surly and irritable. This condition became so serious that the doctor was consulted. He found that there was no question of illness in this case, and made a point of watching Bertha at her machine during his tour of the plant. He asked her what was the matter with her job. Her reply was that the machine was "too damn slow," and she would like somebody to do something to speed it up. It was explained to her that speeding up the machine would mean that she would have to work harder. Upon her insistence, the machine was speeded up 26%. A few days later the doctor passed that way again and was delighted to see Bertha as busy as a beaver and wreathed in smiles.

While it is the task of plant managers, foremen and the industrial relations department to create working conditions and equipment which will call for a minimum of expenditure of energy and a maximum of comfort and cheerfulness to the worker, it devolves upon the industrial physician to give his final approval to the effectiveness of such surroundings and equipment.

Industry quite frequently fails to appreciate the significance of job misfits. Many an individual has entered a plant, a factory, or a store with strong hopes of working his way up to a substantial earning capacity, only to find that because of influences which he could not understand, he was a failure. Unwise selection and job assignment on the part of management or supervisors has, in many cases, brought that disastrous feeling of frustration and failure and made what might have been a productive member of a community nothing more than a social liability and an object of charity. Industrial management often fails to realize the bitter sense of defeat, the feeling of hopeless inferiority that comes to those that find themselves incapable of doing the job to which they are assigned.

Two striking examples of job misfits have recently come to my attention.

The first is that of a worker in Pittsburgh whose i.q. was close to that of a moron. He was hired as a barrow man at 56 cents an hour, and his job was to load a wheel-barrow at one end of the yard, push it to the other end of the yard, empty it, and return, and to do this all day long. He liked his job, and he worked so well that his pay was increased to 60 cents an hour. On the strength of this increase he got married. Following his marriage, the management decided that they would promote him, and they gave him a higher paid job, working in the plant on a machine which required quick reactions and considerable manual dexterity. The man was such an absolute failure at this job that after a period of trial he was

slated for dismissal. He was referred to the industrial relations department of his company.

In a completely bewildered state of mind, he said something to this effect: "I was happy pushing a wheel-barrow. I could live on 60 cents an hour. I got married and now my wife is going to have a baby. Then they gave me another job. Now they say I am no good and they want to fire me." He broke down and wept and said: "Why can't a man be let do the same thing all the day long?" He was put back on the wheel-barrow job and has since proved a satisfactory employee.

In contrast to this case we had the following example in our own company within the past few weeks.

One of our plant managers told the head of our industrial relations department that a certain man recently employed was an excellent worker, but that he had been using abusive language to one of our women employees and would have to be discharged. The man was sent to our industrial relations department. He was a fine type of young French Canadian, 24 years of age. He had enlisted in 1939 and trained in England in commando work which finally brought him to the beach at Dieppe where he was wounded and had to be invalided home.

He was employed by us as one of a large group of new employees that were taken on in response to an urgent call for increased overseas export. The fact that he came in this large group of individuals is our only excuse for assigning him to the job he had. This job consisted of taking empty cases from a table and placing them on a conveyor. These cases had been previously emptied by women. One of these women apparently had the habit of leaving a block of wood, which was used in her work, on the floor where this man tripped over it. Finally he blew up and practically went berserk.

This, I think, is an excellent example of a job misfit. Here was a man who had been trained for years as a fighter, he was tough, his whole training had been directed to making him hard, and to encourage him to fight furiously, and he was placed on a job which was monotonous and far below his physical abilities. The answer, in his case, was to give him a hard job, in fact, he asked for a harder job, and I believe has been happy and successful in his new assignment.

Industry must recognize its social obligation to the worker, to the home, to the community. It must recognize that when workers are assigned to jobs for which they are unsatisfactory and in which they fail, it is the responsibility of management and not the worker. Well-developed industrial relations departments have at their heads well-trained industrial directors. These individuals have been taught, through new types of training, the importance of fitting the square peg into the square hole. However, this training has been only recently developed. Despite the training, industrial directors or employment managers have done a considerable degree of guessing or they have employed those hazardous empirical methods which are handed down from the past. It is the industrial physician who must check and verify the conclusions reached by the industrial relations department in order that job misfits may be reduced to a minimum.

The primary problems of employees are emotional problems. It can be safely said that 60% of plant employees will cooperate, are friendly and efficient. It is the 40% who constitute the so-called problem employees with which supervisors and management find their greatest difficulties. It must be recognized that the word "maladjustment" suggests, in a general sense, not so much a matter of intelligence and skill as it does emotional values, emotions of fear, insecurity, and antagonism. It can be safely said that the main problems in industry where human factors are concerned, are emotional problems. The industrial physician, the industrial nurse, and the personnel administrator is, therefore, dealing with emotional problems rather than logical problems.

To deal with these problems competently, one must have a knowledge of the cause and effect of emotional disturbances. In other words, one should know something of sociology, psychology and psychiatry. To be of practical value, this knowledge must be entrusted to us who are in daily contact with our workers and their problems. It is we, who have the confidence of workers and management, who are in the best position to apply this special knowledge. It is neither practical nor desirable to have psychiatrists regularly attached to the staff of industrial medical departments. In the first place, there are not enough psychiatrists to go round and even if there were, it would be impracticable to assign specialists of this type to industrial concerns. I think it is fairly generally agreed that in industry we must depend upon and apply our own knowledge of psychology and psychiatry, but this, of course, is only done within certain limits.

Dr. Giberson[3] says "Industrial psychiatry can never hope to be anything but preventive and selective—the separating of the sheep from the goats. Actual therapy must remain where it has always been, in the hands of the private practitioner and the institutions, public or private, created for the purpose."

In the same article Dr. Giberson states that "The industrial physician can start an effective program at once, and that without the immediate need of specialized training other than a sympathetic understanding of the new objectives." She enumerates the following procedures which can be done without any very extensive knowledge of psychiatry.

1. He can expect and trace the emotional complications which will come with every injury and illness he treats or advises on. Even a rough record of his findings may provide valuable data for generalizations.
2. He can listen. The therapeutic value of the interview is considerable, and the connection between surface symptoms of seeming irrelevance such as insomnia, "stomach trouble," and vague neuralgias, with serious underlying conditions may be detected in time for remedial action.
3. He can diagnose the industrial trouble spots—foreman, environment, fatigue, group maladjustment—by analyzing and reviewing his cases at regular intervals.
4. He can spot the accident-prone, the accident repeaters.
5. He can recognize the obvious maladjusted types, arrive at a rough classification and dispose of them by advising transfer, outside therapeutic treatment, or education of the employee in simple principles of mental and physical hygiene.
6. He can help prevent maladjustment by exercising actively his advisory function: (*a*) by repeatedly bringing to the attention of management each proved instance of preventable maladjustments; (*b*) by encouraging foremen, section heads, and supervisors to come to him for advice and information on employee problems; (*c*) by doing all he can to bring the extra-industrial factors to bear upon any interpretations of employee difficulties.
7. He can conserve manpower and uphold morale through fighting to secure medical immunity for the emotionally ill.

The impression given by another speaker this evening* of throngs of men and women who were clamouring at the gates of our plants and factories for the right to earn a livelihood was most impressive. To us in the medical and industrial relations field, these thousands of

*MR. J. C. CUSHING, Vice-president of the National Breweries Limited.

individuals pose a special problem, and while the mind of management is rightly concerned with finding employment for these people, we must see that they are placed in the jobs which they can best perform. We must consider them, not merely as a throng of people, but individual human beings, each possessing his quota of vital, productive, creative, human energy. It is safe to say that no problem confronting industry is more serious than that of aiding the worker to use, to the fullest possible extent, his own energy, his own ability, for his own comfort and success.

We cannot help the worker to make better use of his capacity and abilities unless we clearly understand the problems confronting men and women as they enter our complex social-industrial world. It is well, I think, to ask, "What does the worker bring to the job?" He brings his heredity, his health, his behaviour habits, his social attitude, and his emotional reactions. "How is the worker different from each other worker?" To begin with, the worker is the product of his particular type or kind of heredity. This means that physically, his organic function, his physiological make-up is at a particular level, a particular state of health. His heredity also pre-determines his intelligence, his capacity, and his skill. He comes from a particular type of home which has conditioned him in certain fundamental behaviour habits. His degree of emotional stability, his social attitude, have been pre-determined by parental influence, and by the influences of neighbourhood, school, and church. The quality or degree of self-reliance, initiative, response to authority, and his sense of personal responsibility, ethics and morals have been given direction by his early environment.

These are the things the worker brings to the job. In the degree in which he possesses these factors, he differs from every other individual. These are the factors that must be clearly understood, properly analyzed, and accurately evaluated. To properly measure and evaluate these factors or variations in their degree, new techniques are required, not the techniques based upon logic, mathematics, or chemical formulæ, not the techniques used in machine design, machine maintenance, planning and scheduling, and production. We need human techniques that can measure, evaluate and treat human factors such as attitudes, emotional responses, in short, the factors of human behaviour.

References

1. SAPPINGTON, C. O.: Essentials of Industrial Health, J. B. Lippincott, 1943.
2. McCORD, C. P.: Industrial Hygiene for Engineers and Managers, Harper & Brothers, 1931.
3. GIBERSON, L. G.: Manual of Industrial Hygiene, Saunders, Philadelphia, 1943.

Western Association of Industrial Physicians and Surgeons

AGAIN this year the WESTERN ASSOCIATION OF INDUSTRIAL ICIANS AND SURGEONS will meet the day previous to the opening session of the California State Medical Association. The meeting this year will be the afternoon and evening of Saturday, May 6, at the Biltmore Hotel, in Los Angeles.

Because of war restrictions and the difficulties incurred in traveling, there will not be so many guest speakers from a distance as last year. However, the invited guests for 1944 are no less renowned or impressive. As this notice goes to press, the Secretary is unable to supply all the titles of the proposed papers, but they will be found in a subsequent notice to all the members. The list of speakers includes:

1. DR. ALICE HAMILTON, internationally noted industrial toxicologist and pioneer in the field of industrial medicine.

2. COMMANDER HENRY H. KESSLER, MC, U.S.N., author of the well known book, "Accidental Injuries," and a long recognized authority in corrective orthopedic surgery and rehabilitation of the injured. DR. KESSLER is in charge of this type of work for the Navy at Mare Island, and has just returned from the South Pacific.

3. DR. DUDLEY A. IRWIN, Medical Director of the Aluminum Company of America. It was DR. IRWIN who, along with DENNY and ROBSON, did the original investigation of the use of aluminum dust in the prevention of silicosis.

4. DR. CHARLES F. KUTSCHER, consultant for the Carnegie-Illinois Steel Company, and the Industrial Hygiene Foundation of Pittsburgh, who will discuss the little known subject of chemical injuries to the eye.

5. DR. FRANCIS E. BALLARD, Chief, Department of Industrial Hygiene of the City of Los Angeles. DR. BALLARD has been investigating the effect of continuous grasping and squeezing movements upon the muscles of the hands.

6. MR. DOUGLASS A. CAMPBELL, Referee of the California Industrial Accident Commission. Few lawyers have such insight into the medical aspect of the medicolegal problems as does MR. CAMPBELL. From his experience he will present some phases of the legal difficulties confronting the industrial physician.

In addition to the above-named speakers, there will be papers discussing the future of aviation medicine, psychical factors as a cause of maladjustment to working environment, and several other subjects.

For any additional details, write the Secretary, DR. RUTHERFORD T. JOHNSTONE, 423 Towne Avenue, Los Angeles.

G. M. Medical Conference

GENERAL MOTORS' Eighth Annual Medical Conference will be held this year at Newark, New Jersey, April 13 and 14. On the first day, with DR. G. A. PAUL, medical director, Hyatt Bearings Division, as host, there will be moving pictures of plant operations and a plant walk, followed by "Practical Application of Psychiatry in Industrial Medical Practice," by DR. G. A. EADIE, Eastern Aircraft-Linden Division, DR. D. F. FRAME, Eastern Aircraft-Bloomfield Division, and DR. W. J. FULTON, Eastern Aircraft-Baltimore Division. After lunch at the Hyatt cafeteria, DR. PAUL and DR. F. APPLEBAUM will discuss "Cafeteria Service in Industry." Later, at Bloomfield, DR. W. KRUGER, medical director, Eastern Aircraft-Bloomfield Division, as host, will conduct a plant walk. The conference dinner will be held in the evening. On the second day, DR. R. A. YOUNG, medical director, Eastern Aircraft-Linden Division, as host, will conduct a plant walk, after which DR. S. J. GREEN and DR. L. J. BERG will present "Medical Department Contributions to Manpower Problems," and DR. KRUGER and DR. YOUNG will discuss "Some Experiences in Rehabilitation." In the afternoon DR. J. F. JOHNSON, medical director, Eastern Aircraft-Trenton Division, will present "Maintenance of an Industrial Hygiene Program," and later there will be a demonstration at the airfield.

Massachusetts Conference

THE Twenty-Third Annual Massachusetts Safety Conference, on "War Production and Civilian Defense," Boston, April 24 and 25, will feature sections on (1) "Worker Health in Wartime," and (2) "Medical Service in Wartime Industry." At the first, on April 24, with DR. W. IRVING CLARK, director of personnel, Norton Company, presiding, JOHN B. SKINNER and WILLIAM B. PIERCE, of the Massachusetts Division of Occupational Hygiene, will discuss "Practical Considerations in Industrial Heat and Humidity Control"; PROF. PHILIP DRINKER will present "The Health Maintenance Program of the U. S.

Maritime Commission"; and DR. DAVID A. MCCOY will speak on "Industrial Noise." At the second, on April 25, with DR. DWIGHT O'HARA as chairman, DR. HARRY C. SOLOMON will speak on "The Problem of the Psychoneurotic in Wartime and Postwar Industry"; DR. DAVID ZACKS, on "Tuberculosis Case Finding in Massachusetts Industries"; and DR. CHESTER M. JONES on "The Importance of Peptic Ulcer in Industry."

New York Post-Graduate

THE FIVE-DAY course in Industrial Medicine, announced by New York Post-Graduate Medical School, for April 10 to 14, 1944, under the direction of DR. HARRY J. JOHNSON, has the following schedule:

Monday Morning, April 10

ORGANIZATION and Management of an Industrial Medical Department: Special Problems of Small Plants"—DR. HARRY J. JOHNSON.

"Physiotherapy—Its Use in Industrial Medicine" (Demonstrations)—DR. JOHN D. CURRENCE.

Monday Afternoon

THE LESS Familiar Metals—Arsenic, Antimony, Cadmium, Chromium, Magnesium, Manganese, and Zinc"—DR. BERTRAND E. LOWENSTEIN.

"Industrial Absenteeism—Cause and Remedy"—DR. FRANK R. FERLAINO, New York Telephone Company.

"Medical Considerations of the Air Passenger: Prevention of Air Sickness: Contra-indications to Flying"—DR. HOWARD EDWARDS, Medical Director, Eastern Air Lines.

"Lead and Mercury Poisoning"—DR. MAURICE BRUGER.

Tuesday Morning, April 11

HEART Disease in Industry: Heart Disease in Relation to Physical Strain: Value of the Electrocardiogram: Compensation Considerations"—DR. HENRY B. TURNER.

"Mass Survey of Tuberculosis in Industry"—DR. C. M. SHARP, Surgeon, U. S. Public Health Service.

"Pre-employment Examinations: Placement of the Sub-Standard Worker"—DR. HARRY J. JOHNSON.

Tuesday Afternoon

DUST Diseases—Silicosis, Asbestosis, Tuberculosis: The Problem of 'Grinding Dusts': Compensation Problems"—DR. ISRAEL G. EPSTEIN.

"Vascular Diseases in Industry: Buerger's Disease, Varicose Veins, etc.: Prevention, Treatment, Compensation Problems"—DR. A. WILBUR DURYEE.

"Compensation Laws: Special compensation problems"—Liberty Mutual Insurance Company.

Wednesday Morning, April 12

ERUPTION Characteristics: Clinical and Differential Djagnosis of Industrial Dermatoses" (Lantern slides)—DR. JESSE A. TOLMACH.

"The Importance and Demonstration of Patch Testing: Treatment and Prevention of Industrial Dermatoses" — DR. EUGENE F. TRAUB.

Wednesday Afternoon

NUTRITION in Industry"—DR. HARRY J. JOHNSON.

"Industrial Physician's Responsibility in Accident Prevention: Safety Measures"—Liberty Mutual Insurance Company.

Thursday Morning, April 13

TRAUMATIC Surgery in Industry "Hand Infections"—DR. HENRY H. RITTER.

"The Treatment of Burns"—DR. EMMETT A. DOOLEY.

"Fractures of the Bones of the Hand"—DR. WALTER D. LUDLUM.

"Soft Tissue Damage, Including Tendons and Nerves: Chemotherapy."—DR. DAVID GOLDBLATT.

Thursday Afternoon

COLLES' Fracture"—DR. ERNEST W. LAMPE. "Fractures About the Foot and Ankle"—DR. B. BERNARD KAYE.

"Shoulder Injuries"—DR. HARRY V. SPAULDING.

Friday Morning, April 14

EYE Injuries: Emergency Treatment. Prevention"—DR. RUDOLF AEBLI.

"Posture: Care of the Feet to Avoid Fatigue: Shoes: Special Orthopedic Problems of Women in Industry: Methods of Correction of Foot Disabilities"—DR. WILLIAM H. IRISH.

"The Promotion of Optimum Health of the Industrial Worker: Periodic Health Examinations: Habits, Diet, Rest, Recreation"—DR. HARRY J. JOHNSON.

Friday Afternoon

WOMEN in Industry: Special Considerations: Employment Environmental Problems: Menstrual Problems: Pre-employment Examination: Periodic Health Examinations: Rest, Diet, Clothing, Recreation"—Lecturer to be announced.

"Gas Poisoning—Fumes as a Hazard: Discussion of Sulphur Dioxide, Ammonia, Formaldehyde, Carbon Tetrachloride, Benzol, Toluol, and the Fluorides"—DR. FREDERICK B. FLINN.

Indiana Program

THE PROGRAM of Indiana State Medical Association's Second Industrial Health Conference at Indianapolis, April 19 and 20 (see page 34):

Wednesday Morning, April 19

PRESIDING: E. S. JONES, M.D., Chairman, Committee on Industrial Health, Indiana State Medical Association.

"Obligations of the State Medical Association in the Training of Industrial Physicians"—J. T. OLIPHANT, M.D., President, Indiana State Medical Association.

"Postwar Industrial Health Problems"—R. L. SENSENICH, M.D., Member Board of Trustees, A.M.A., South Bend, Indiana.

"Medical Records and Record Keeping in Industry"—S. R. RANKIN, M.D., Medical Director, Indiana Ordnance Corporation, Charlestown.

"Occupational Acne"—SAMUEL PECK, SR. SURGEON (R), U. S. Public Health Service, Division of Industrial Hygiene, Bethesda.

Wednesday Afternoon

PRESIDING: RAYMOND HUSSEY, LIEUT.-COL., M.C., U. S. Army.

"Disability Evaluation"—Speaker to be named.

"Treatment Hand Injuries"—SUMNER KOCH, M.D., Chicago.

"Preventive Medicine in Industry"—JOHN H. FOULGER, M.D., Director, Haskell Laboratories, E. I. du Pont Co., Wilmington.

Wednesday Evening

DINNER MEETING: "Value of Industrial Medical Services in Industry" — VICTOR HEISER, M.D., Medical Consultant, N.A.M.

Thursday Morning, April 20

PRESIDING: J. G. TOWNSEND, M.D., Medical Director, Chief, Division Industrial Hygiene, U. S. Public Health Service, Bethesda.

"The Importance of Fungus Infections in Industry"—SAMUEL PECK, SR. SURGEON, (R), U. S. Public Health Service.

"Prevention and Treatment of Silicosis with Aluminum"—D. A. IRWIN, M.D., Medical Director, Aluminum Company of America.

"A New Technique in Drawing Blood for Serodiagnostic Tests: Use of the Hemospast"—KENNETH MARKUSON, M.D., Director, Division of Industrial Hygiene, Michigan State Board of Health, Lansing.

"Lung Changes in Electric Arc Welders"—O. A. SANDER, M.D., Medical Consultant, Industrial Hygiene Foundation, Milwaukee.

Thursday Afternoon

SYMPOSIUM on Rehabilitation and Employment of the Handicapped Veteran—A. J. LANZA, COL., M.C., U. S. Army, Moderator.

"Present-Day Employment of Physically Handicapped Under Federal Civil Service"—VERNE K. HARVEY, M.D., Medical Director, U. S. Civil Service Commission, Washington.

"Putting the Veteran Back to Work"—Speaker to be announced.

"Community Organization for Rehabilitation and Re-employment" — HAROLD VONACHEN, M.D., Medical Director, Caterpillar Tractor Company, Peoria, Illinois.

IN INDUSTRIAL MEDICINE for January, 1944 (page 51) there appeared a preliminary report on our questionnaire survey regarding the use of oral catarrhal vaccines in protecting industrial workers against the common cold, with particular emphasis on their effectiveness, if any, in reducing absenteeism due to colds. Following are the final figures on this survey:

Oral Cold Vaccines

1. Are you using an oral catarrhal vaccine?

Yes	315	(40%)
No	467	(60%)
Total return	782	(100%)

		TOTAL USERS	
		No.	%
2. What brand of oral catarrhal vaccine are you using? (All brands)	(% of oral vaccine users)	315	100%
3. Have you used this or a similar product in past seasons?			
Yes	(% of product users)	251	80%
No	(% of product users)	47	15%
No answer	(% of product users)	17	5%
4. What has been your experience as to effectiveness?			
Satisfactory	(% of product users)	178	57%
Unsatisfactory	(% of product users)	51	16%
Don't know	(% of product users)	86	27%
5. What is the number of employees under your care?	(Average per doctor answering question)	3480	
6. How many of your employees are taking the vaccine?	(Average per doctor answering question)	558	
7. What percentage is this of the employees under your care?			16%
8. What is the usual number of tablets or capsules issued to each employee?	(Weighted average)	36	
9. Is the entire quantity issued at one time or at intervals?			
At one time	(% of product users)	160	51%
At intervals	(% of product users)	97	31%
No answer	(% of product users)	58	18%
10. Do you prepare dispensing units or purchase in units from manufacturer?			
Prepare dispensing units	(% of product users)	142	45%
Purchase dispensing units from manufacturer	(% of product users)	94	30%
No answer	(% of product users)	79	25%
11. What is your method of charging employees?			
Dispense free	(% of product users)	105	33%
Make nominal charge	(% of product users)	46	15%
Dispense at cost	(% of product users)	82	26%
Prescribe for employes	(% of product users)	30	10%
Other methods	(% of product users)	10	3%
No answer	(% of product users)	42	13%

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Current Definitions of Public Health

WITHIN the last few years both official and non-official public health agencies have taken an increasing interest in both the community activities which affect industrial health and the in-plant activities which hitherto have been solely a matter of concern to those who were classed as industrial physicians and surgeons.

This influx of enthusiasts into what, to them, constituted a new field has resulted in attention being even more sharply focused on the industrial medical department, which on its own account had already begun to glisten in the light of public attention.

Hugh Young is credited with having removed the doctor who treated only gonorrhea from the gas-lit dark alley, where he was recognized merely as a "back-stairs" practitioner and having lifted him into the hospital ward where, as a "urologist," he became a deservedly respected department head. No single person but a large group, the core of which is comprised of the older members of the AMERICAN ASSOCIATION OF INDUSTRIAL PHYSICIANS AND SURGEONS, have similarly raised the status of the industrial doctor from that of a "finger wrapper" to one of medicine's most respected practitioners.

Three decades cover the span of the real evolution of industrial medicine to date. Its practitioners have consciously and proudly practiced a type of "group medicine" which only at its extreme border ever offered complete medical care, and only at its opposite extreme edge limited itself to the bare legal necessity to grant the compensation law its pound of flesh.

This type of practice has consisted of a modification of private practice which (1) referred to the private practitioner the handling of those ailments that properly remained in his domain, and (2) properly expected the public health agencies to meet their responsibilities in the community. The industrial physician not only denied that he was infringing on private practice, he truly claimed he was increasing its opportunity. He is equally loath to admit that he is practicing as a public health physician. He will admit that his health advice may constitute a health education program, and he will also recognize that his mass measures, particularly those which prevent occupational diseases, have much in common with the public health programs, but he has not volunteered to carry the full burden of the industrial community's public health needs.

Among the many advantages accruing from the interest of health agencies referred to in the opening paragraph has been an increased recognition by the industrial physician that much of the service he is rendering is a public health service, and, on this account, he can gain from advice and consultation with experts in this field.

Public health personnel is no longer ignoring industrial medicine. A corollary of this is that industrial medicine can no longer ignore public health. For that reason we believe we are justified in exploring the philosophies of this new ally, for the final blending of private practice and public health must inevitably rest on the practicing industrial physician. The concepts of those at the national level of either organized medicine, which is greatly concerned with private practice, or at the national or state level in public health must be sorted out and fitted individually at the level of the medical department in the plant, or no progress will have been translated into employee benefit. If the myriad of ideas emanating from the various agencies—particularly since Pearl Harbor, when all visionaries donned spectacles which had "War Effort" stamped on the lenses—were to be adopted simultaneously without a sorting out and fitting, chaos would replace what is now, at the worst, a mild bewilderment.

Currently "public health" is no longer a phrase with a single meaning. Interpretations vary between official agencies and non-official agencies, and within these groups. In non-official agencies the ideas run the gamut from pure education to complete medical care for some diseases, and in official agencies the variation is no less striking. State departments range from an objective to control communicable diseases only, up to elaborate clinic programs. Inconsistencies in Federal philosophies as represented by various agencies are no less striking.

In asking for a set of definitions into which any concept can be fitted, we certainly do not wish to imply either blanket approval or blanket criticism of any group. We *may* wish to evaluate for ourselves the soundness of the ideas once they are defined. We have great respect for some agencies which, for years, have slowly and painstakingly advanced the cause of public health and have contributed to its evolution. Should they change their philosophy or their pace we believe we are entitled to be informed of the change. There are other agencies, newer in the field, which are extending their services so rapidly that we wonder whether a statement of their aims will be made only in terms of a "fait accompli." After all, the letter "r"

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is the only difference in spelling between "evolution" and "revolution," and speed of change is the great difference in the two states. We wonder whether we should not be allowed time to digest the great changes the past several years have brought, and incorporate into our ideas of practice the newer ideas in public health which stand up under thoughtful study. We believe this evaluation would be simplified if we were to receive from the originators of these newer ideas their definition of "public health."

DR. PILGRIM

IT IS interesting to observe, in the midst of goings and comings throughout the tangibles of this world, that one may at the same time adventure among the intangibles. And fruitful is a voyage within the purlieus of either the one or the other. The one, where men perform their work, offers great persuasion to wonder. The other, wherein men attempt to think, and give their emotions added length of leash, yields cause to stand amazed.

But first the one: whereof the month began with studies in an Ohio plant devoted to the heavier means of war, to find the source of hazards, concerning which the utmost search, at work as well as laboratory, furnished none. Testings by chemical, petrographic, spectographic, polarographic, and x-ray diffraction analyses—with all the science gamut of their use—evolved no whit of risk. Whence came conclusion that the "reeking tubes," with mortal peril rife, imputed fears to their making akin to those of their aim—such being the sometimes devious course of emotion in crawling its crab-like way along the path of ratiocination. Thence to conference with representatives of the labor department regarding an industrial operation which is so unusual that there are but four of its kind among all the plants given over to wartime needs. From which to lectures and addresses:

To students in medicine, anent the meaning of industrial medicine, hygiene and health—an important consideration for those who will assume, tomorrow, their places as today's physicians.

To the technicians at Purdue Industrial Vision Institute, with GARDINER WIRT, TIFFEN, SHERMAN and REED; this followed by dinner and an evening of ideas regarding the enhancement of means to better industrial vision, and the value thereof in the matters of job placement and prevention in general.

To industrial hygiene and safety groups in Michigan on the cooperation of medical and lay people in their problems of mutual interest; and much impressed with both the fact and the ceremony of the formal recognition given an industrial nurse for her 23 years' expression of the highest ideals of her fine calling.

And to post-graduate students of industrial medicine on medicolegal phases, but finding them more interested in trauma and the surgery thereof than in the problems of less personal significance, and reminded thereby of DR. RUTHERFORD JOHNSTONE'S "Industrial medicine is *more* than traumatic surgery," this, however, being something needing time to learn.

Then to West Virginia, where, as monotonously often, the claims regarding an industrial dust exposure had little relevancy to the facts of the same. And a meeting with the program committee for Midwest Safety Conference, where were KRONENBERG, CROSSER, MCCONNELL, COOK, WEYMAN and LITTLEFIELD, and there was heavy stress on industrial relations and the place thereof in the picture of medicine, hygiene and safety, departing with the thought that "industrial relations" is a term of nimble meanings—which thought touched off an Odyssey in the realm of ideas whereof the record includes the following:

"Selective placement," coming now to be much talked, is a pleasing term, fortuitous in breadth and precision, at once the duty, opportunity and high function of the industrial physician, and eloquent of possibilities in rehabilitation—so much the latter, indeed, that already a swarm of agencies, governmental, charitable, and newly spawned to seize upon the opportunity and get in on the publicity, are, in DR. SELBY'S apt expression, "vieing with each other for the chance to escort the returned disabled veteran to the factory gate." Wherefore it is well that behind the gate stands the doctor, lest the great and permanent good that can eventuate from the purpose done be too much dissipated in excess of zeal for the fanfare of the doing. . . . And behind the doctor stand the industrial hygienist, the industrial relations officer, and the safety director. Not each, however, holds his place and title by reason of qualification therefor. The doctor has professional education and medical license, and none may own his designation without the right to it, earned and demonstrated. The industrial hygienist likewise has professional education, but, misfortunately, the title whereof he is proud is not yet limited to those with proved possession. Wherefore it much behooves these men to hold close-knit their ranks of recognition and keep their standards high, lest company title or government office impute to its incumbent that profound wisdom in all things, however scientific, which it is the habit of titles to assume and offices to arrogate.The which has meaning in the light of the Perkins move to establish a new bureau of industrial hygiene in her labor department to compete with that one now doing so fine a job in the Public Health Service. Wherefore there is no need for such new bureau, but need for thought regarding the commandment: "Thou shalt not covet . . . anything that is thy neighbor's"—not even the credit that belongs to him for work well done. Of which, however, more to come anon . . . How to educate? How reach the man, in charge of a foundry with nigh a thousand workers, who had several dozen silicosis cases in his plant 10 years ago, has been paying for them ever since, installed no means of prevention whatever, now has as many newly found as have been settled with, and merely says: "Oh, well, we pay for insurance!" Or the other man, whose business was begun years since in a small town and has grown there till it hires 4000—a fourth of the population—but who refuses to put in even so little as a first aid unit because all the local doctors are his long-time friends and he doesn't want the ill-will of any among them. In thought of this there still abides a modicum of comfort, in that competition in the long run will educate all businessmen, or large or small—albeit that "long run" may not even start until the war is over, as to which there is none for whom the dawn of peace can come an hour too soon . . . What is an "expert?" There are many of them! One reading the daily press encounters their opinions so often that verily there seems no matter of thought or substance in which they hold themselves unlearned. Whereof, were one to set himself up as an expert on "experts," he might opine that most of them are recipients of a title which few deserve though many desire, and that on obtaining the same some grow to fill it, whereas the larger number do merely swell . . . From whence it was grateful to return to the quietude of reading among the works of those whose names convey renown of merit earned. Concerning which—without intent of any "expert" cast—the new 15th edition of OSLER'S "Principles and Practice of Medicine" again impressed with meagerness of late references and up-to-date ideas in the sections thereof which deal with occupational and industrial maladies, and led to wish that modern texts for undergraduates would steer the more away from fantasy and folklore. And likewise seemed "Health Education on the Industrial Front," though adequate, to lack somewhat in concrete plans for industrial health education. And a treatise on occupational medicine, written in 1837 by one BENJAMIN W. MCCREADY, M.D., and reproduced last year by Johns Hopkins Institute of Medical History, regardless that its author was but 23 when he produced it, is full of wise principles. Wherewith the termination of this allotted space!

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Industrial Health and the Doctor

—Abstracts of Papers given at the Cincinnati Meeting of the Ohio Series, February 10, 1944—

Reported by
C. O. SAPPINGTON, M.D., Dr. P.H.

FOUR very interesting meetings, sponsored by the Ohio State Medical Association, on the above subject, were held in: Toledo, February 7; Cleveland, February 8; Columbus, February 9; and Cincinnati, February 10. The latter meeting is reported here.

The pattern of the meetings was similar, starting at 4:00 P.M. for an afternoon session, recessing for dinner, and having an evening session; and three out-of-town guest speakers of national reputation were featured at each: DR. CAREY P. MCCORD, Medical Consultant, Chrysler Corporation; DR. FRANK F. TALLMAN, Director Mental Hygiene, Michigan State Hospital Commission, Lansing; and DR. RUTHERFORD T. JOHNSTONE, Director of Department of Occupational Diseases, Golden State Hospital, Los Angeles, Calif.

The program for the Cincinnati meeting follows:

PRESIDING: L. HOWARD SCHRIVER, M.D., President-Elect, Ohio State Medical Association:

"Conservation of Industrial Manpower," CAREY P. MCCORD, M.D., Detroit; medical consultant, Chrysler Corporation, and medical director, Industrial Health Conservancy Laboratories, Detroit.

Series of Informal Discussions:

1. "Why a Local Industrial Health Program," OTTO P. GEIER, M.D., Chairman, Committee on Industrial Health, Cincinnati Academy of Medicine.
2. "Planned Activity by the Local Committee on Industrial Health," D. W. HEUSINKVELD, M.D., Member, Committee on Industrial Health, Ohio State Medical Association.
3. "Relationship Between the Medical Profession and the Ohio Industrial Commission," ROBERT M. ANDRE, M.D., Supervisor, Medical Section, State Industrial Commission.
4. "The Place of the Individual Physician in Industrial Health," ROBERT A. KEHOE, M.D., Chief, Kettering Laboratory, University of Cincinnati College of Medicine.
5. General Discussion: opened by CHRISTOPHER LEGGO, M.D., Chief, Division of Industrial Hygiene, Ohio Department of Health.

PRESIDING: E. O. SWARTZ, M.D., First District Councilor, Ohio State Medical Association:

"Occupational Disease Problems and How to Meet Them," RUTHERFORD T. JOHNSTONE, M.D., Los Angeles; director, Department of Occupational Diseases, Golden State Hospital, Los Angeles; former assistant professor of medicine, University of Pittsburgh School of Medicine; consultant on occupational diseases, California State Board of Health; author of "Occupational Diseases."

"Absenteeism and the Doctor," FRANK F. TALLMAN, M.D., Lansing, director of mental hygiene, Michigan State Hospital Commission.

General Discussion.

The order of the above program was varied, as will be shown in the abstracts.

Afternoon Session

BEGINNING at 4:00 P.M., varying the scheduled program, a film prepared by the U. S. Public Health Service with reference to public health activities was exhibited.

DR. D. W. HEUSINKVELD discussed "Planned Activities by the Local Committee on Industrial Health."

It is the primary purpose of health service in industry to conserve the health of the worker and to increase production. Several meetings have been held previously with this objective in mind.

Surveying the facilities of Hamilton County, it has been discovered that there are approximately 100 physicians occupied in industrial medicine. The small plant has been as much of a difficulty in wartime as in peacetime, and represents 560 of the 620 plants in Hamilton County. The small plants need not necessarily duplicate the large plant activities. The following factors are important:

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1. The availability of practicing physicians.
2. Physical examinations should include x-ray of the chest. For this, the Department of Health is available.
3. There should be tuberculosis case-finding activities among the employees. (Figures were here given for previous studies made by Powers x-ray.)
4. The experiences quoted by DR. VICTOR HEISER show that diet bears a distinct relationship to gastro-intestinal disturbances, pneumonia, heart, and other difficulties. Educational material is available from many sources on these points.
5. The Department of Health has engineers available for hygiene studies.
6. The rehabilitation program has for its objective the return of the soldier to society, and his proper placement, and in this the physician has a very definite responsibility.
7. The Committee on Industrial Health of the State Medical Society will sponsor future courses along these lines.

DR. OTTO P. GEIER spoke on the subject "Why a Local Industrial Health Program?"

Employers and physicians should join in cutting down the huge losses due to inefficiency, sickness and other factors. Mental and physical health is a requisite for an efficient employee.

The employer can make a real contribution to health programs without its being a real item of cost, according to various compensation figures where there is or is not a health service. The cost varies considerably, and the cost of occupational diseases is proportionately higher, especially if the same care given to machines is not given to men. It is logical and sound economy to set up a health maintenance department.

Already industry largely supports community hospitals through taxes, and this is another item which should be well understood and realized.

The physician is a very necessary element in the rehabilitation and placement of returning soldiers; in this connection the Worcester, Peoria, and Birmingham plans were mentioned.

With respect to small plants, plans for several small groups to "club" together are advisable.

In all this, we come to the conclusion that human engineering should have been a major subject long ago. In this respect, has not management neglected its industrial relations job?

Referring to historical developments, the industrial physician emerged as a product of the compensation laws. In 1916 the AMERICAN ASSOCIATION OF INDUSTRIAL PHYSICIANS AND SURGEONS was formed and has been a great factor in raising the standards of industrial practice.

DR. GEIER closed his discussion by quoting from various industrialists and Sir George Newman as to the importance of industrial health work.

DR. ROBERT A. KEHOE spoke on the subject "The Place of the Individual Physician in Industrial Health."

The private physician has industrial patients of many kinds through whom he can gain considerable insight with reference to industrial problems. The private practitioner is also in a position to take care of most of the sick coming from industrial groups, because the industrial physician can only do part of this work. This is especially true of small plants, and probably the greatest proportion of private medical work occurs here.

The change of this country from a predominantly agricultural one to a predominantly industrial one presents a real phenomenon and must be appreciated by physicians, the points to be taken into consideration being (1) the great increase of the population employed in industrial pursuits; (2) the changing social and economic viewpoint; and (3) the development of chemical industries.

With regard to (1) and (2) above, many factors tend to standardize fees in private practice. The intervention of community governmental groups has not been fortuitous. Now the physician must concern himself with the employer, the employee, the insurance company, and the unions. The problems of industrial and private physicians were discussed in detail.

With respect to (3) above, ordinarily these problems are beyond the scope of the private physician and he is usually not prepared to solve such problems, as there are so many inherent difficulties. Many abandon regular methods, and speculate and surmise with regard to conclusions or conclusive opinions. The practitioner has many times been too busy or too much impressed by mystery, or has adopted the *post hoc ergo propter hoc* theory. It is largely because of these things that many claims are registered without adequate medical support. It must be emphasized that the time to give attention to an individual is at the beginning of the exposure and periodically, although the actual number of occupational diseases is but a small proportion of all cases causing disability.

The problems of medical education affecting industrial groups are far from solved, but more sound information is now available than ever before.

In conclusion, the individual physician must work with his colleagues and must share his work and experiences with industrial physicians.

DR. ROBERT M. ANDRE discussed "Relationship Between the Medical Profession and the Ohio Industrial Commission."

The cooperative plan has real significance, and the individual physician must pioneer in industrial health work lest certain groups gain ascendency.

The Industrial Commission is vitally interested in the prevention of both accidents and diseases, because of the great losses sustained.

The industrial method of practice introduces a tripartite scheme, of which fixed fees and cooperative work are necessities. Free choice of physicians has been encouraged, and case lifting has been discouraged. It is recognized that the laws are not ideal, but they must be practical.

In the financial portion of the work, claims vary from 50 cents upward, and as much as $40,000 a year has been paid to an individual physician for industrial work.

The principal purpose of all of this work is to return the worker to the job at the earliest possible moment.

Experience teaches us that there is no controversial problem that will not yield to proper consideration; besides the Industrial Commission, there are the Academy of Medicine and the State Medical Association, which can help.

Finally, a revision of the rules and regulations is contemplated, with the help of the Committee on Industrial Health.

DR. CHRISTOPHER LEGGO completed the afternoon session with a brief general discussion.

All plants have a physician rendering service to them if they but knew it. The on-call man and also the part-time man should be encouraged to go more often to the plant.

There are two phases of industrial medicine, the public health aspect and the private aspect. The state and local medical societies must be responsible for both in medicine and public health.

Certain recent experiences lead us to believe that there has been a confusion of lay administration with medical functions, especially in instances where the nurse is alone in an industrial plant.

Those individuals who are rejected on pre-employment or pre-placement examinations should be guided to where they can be properly advised. This is a responsibility of the community and the industry.

Evening Session

DR. RUTHERFORD T. JOHNSTONE presented the subject "Occupational Disease Problems and How to Meet Them."

A review of the horse-and-buggy days in medicine was given, and the differences contrasted with the present situation where there are many complex problems, both medical and social.

Industrial medicine has had a considerable struggle, but it is now recognized and has become a real economic phase of industry; however, we must learn to match job demands. Industrial medicine is more than traumatic surgery, and

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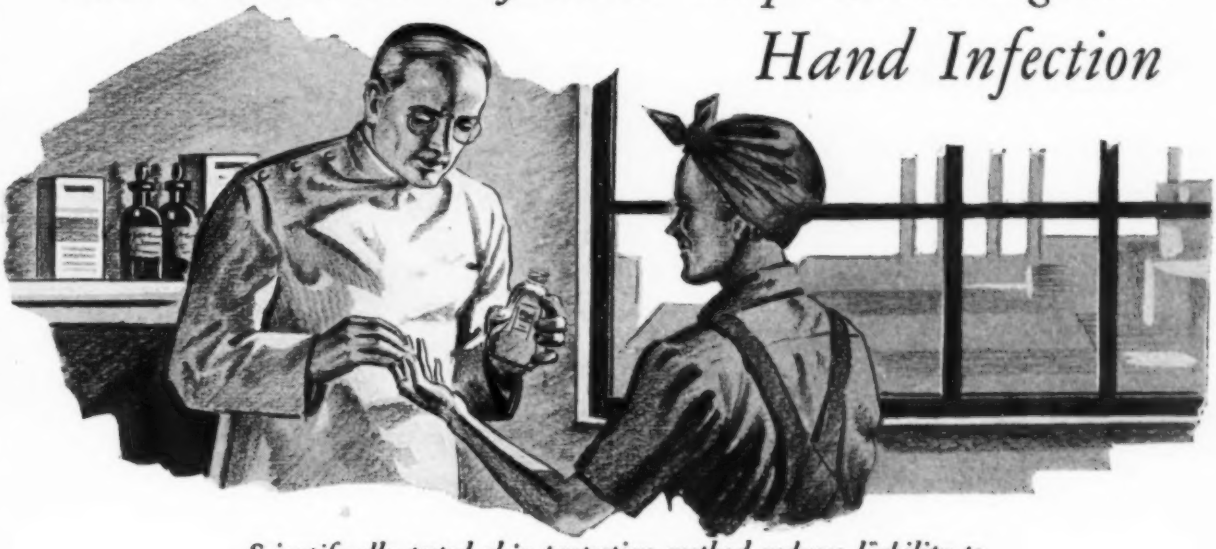

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we must adopt and use intensive specific courses of instruction. We should stop rehashing subjects on medical programs, because usable knowledge is the only practical kind.

Problems in this field are two-fold: (1) functions of the physician; and (2) earmarks of occupational disease.

Commonly, it is the procedure to take a history, make a diagnosis, and use laboratory facilities, but one must prove his diagnosis of occupational disease. An excellent illustrative hypothetical case was given. The real answers lie in unfamiliarity, not with books, courses, and papers, but with the methods and purposes and scope of *investigation.* There are new discoveries and problems daily—who could foresee cadmium poisoning effects, for example? Another example was the discovery of possible fluoride effects in a group of welders, which at one time was not suspected.

The present situation offers a real challenge. Osler, for example, disposed of clinical conjecture by the use of hospitals—so physicians must go into the plants and learn.

Occupational diseases involve the largest number of diseases in any one category, but there is a limited number of clinical examples.

Considerable discussion was given to volatile solvents, with respect to their effects on the nervous system, the blood and the kidneys. Among those mentioned were chlorinated hydrocarbons, carbon tetrachloride, benzol, and the chlorinated naphthalenes and diphenyls. Earmarks were mentioned and discussed, for these as well as for others, from which one should be able to make a diagnosis of the complaint.

There were also allusions to other types of industrial exposures; the necessity of distinguishing between lead absorption and lead intoxication—the fallacies and misstatements in textbooks concerning lead metabolism; the increasing use of cadmium, pulmonary symptoms being the most important, and lack of definite information with respect to acute effects; the fibrous and non-fibrous producing dusts—the need of differentiating silicates from free silica, and mention of asbestos—inert dusts comprising a large group, and the medical profession not generally informed as to the harmlessness of these—the fact that studies on pneumonia and cancer in persons exposed to dusts show no relationship. Welders' siderosis, for example, very commonly thought to predispose to pneumonia, has been proved not to do so.

Considerable confusion exists with respect to medicolegal aspects of occupational disease, and certain groups constitute a bottleneck to progress in this respect in their use of old, erroneous ideas, with respect to clinical manifestations.

In industrial medicine, as in any other type of medicine, we must have careful observation, laboratory work, and diagnosis; we must not depend upon formulae, but upon careful observation and scientific investigation.

DR. FRANK F. TALLMAN discussed "Absenteeism and the Doctor."

This subject is not new to physicians or to industrialists, but it is new to some others. The general practitioner and the psychiatrist have been slow to adapt themselves to industry.

The dynamics of behavior are significant; sometimes it is a question of manual dexterity versus adaptability. The important principle to observe is to treat workers as people.

Industrial medicine has, therefore, become psychosomatic, but in industry there has been much lagging in adapting the methods of personnel relations that are specific; we must understand people in a practical way.

The securing of absenteeism figures is difficult, because records are faulty and have not been standardized. Approximately 80 to 85% of absenteeism is non-industrial and absenteeism is approximately two and a half times higher in women than in men, perhaps because women are more intelligent with regard to the care of the body and perhaps they will leave work more quickly than men.

Epileptics, sclerotics, and neurosyphilitics are prone to accidents. The expression "accident-prone" is meaningless;

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it may indicate compulsion, desire for revenge for fancied wrongs, and other peculiar psychological reactions.

In oldsters it is not enough to tell them to limit their activities; there must be a specific plan. Our experiences in vascular and heart cases are proof of this. Mental hygienic principles are not difficult to understand, and should be kept in mind.

In the post-alcoholic syndromes, relief is sought from psychic pain; here we must treat the personality and not an organ; fear, scolding, and other brow-beating methods will not be efficient.

In problems peculiar to women, we must realize that they are very definitely emotionally unstable in many instances, and they "put it over" quite a bit. Also involved are the early fears ingrained during adolescence. Pregnancy should be dealt with on an individual basis, if at all possible.

Fatigue and worry demand real information concerning mental health, in an investigation of the factors concerned.

Medical schools do not teach enough about people; shop counselling is really needed, and also we need a real consideration of people, instead of so much consideration for syndromes by the physician. A practical dynamic approach to the understanding of people belongs in foreman-training courses. A physician is in a strategic position to appreciate people; indeed the physician is really a doctor of human beings.

In closing, a number of points may be emphasized:

1. Center interest on the patient first.
2. Let the patient *give* a history—don't extract it from him.
3. Let the patient tell about his personal associations.
4. Have a reassuring attitude.
5. Be prepared to deal with hostility, argument, and resentment.
6. Apply the principles of mental hygiene.
7. Face reality.

DR. CAREY P. MCCORD concluded the program, discussing the subject "Conservation of Industrial Manpower."

DR. MCCORD first gave a review of his industrial experiences, and also a panoramic view of previous meetings which were held in other states on this same subject. He believed that "every physician is an industrial physician."

Statistics were presented to show the enormity of industrial medicine problems: there are about 2,800,000 work-places in the country and if one physician were assigned to each 10 of these, it would take 280,000 physicians, more than the entire supply available.

There are about 62 million people now employed in industry, and there are about 30,000 ways of making a livelihood. To get down to specific products, there are 400 different items in a battery, and it takes 30,000 different people to make an automobile.

It is a most significant fact that, if no protection is afforded, three out of four persons are subject to harmful exposure in industrial work at some time.

The questions may well be asked:

1. Why should night workers stimulate themselves to keep awake and, later on, have to take barbiturates to go to sleep?
2. Why do skin eruptions occur among sulpha workers?
3. Why are women absent more often than men?
4. Why is there a considerable increase in industrial dermatoses?
5. Why standardize pregnant women?
6. Why does it take 17 examinations in certain instances to keep one person at work?

In the practice of industrial medicine, one would better be a fair medical man and with a good knowledge of industry than a good medical man with no information concerning industry; we must be able to put our fingers on what causes trouble. Examples were given of this, particularly with reference to the so-called cable rash incident, and also concerning the highbrow specialist who was wrong in his etiology.

Let the physician and industry both get the facts; then situations will be far more simple than the complexities we have at present.

Finally, the cooperation of all physicians is needed in this work.

Health in Industry

—Joint Meeting of Michigan Industrial Hygiene Society and the Greater Grand Rapids Safety Council, February 29, 1944, Grand Rapids, Michigan—

A MESSAGE to Management—Victory on the Battle Front Depends on Health on the Home Front" became the theme of a combined meeting of the above-named groups at Grand Rapids, in February. The speaker, DR. C. O. SAPPINGTON, of Chicago, discussed "The Meaning of Industrial Medicine, Hygiene and Health," showing the relationship of these phases by a series of lantern slides covering the early as well as the modern developments of medical, hygiene and health procedures.

Industrial medicine, hygiene and health must be the concern of industry in postwar plans. Pre-placement examinations, with thorough physical examinations, competent vision tests, dental investigations, and chest x-rays must come as the result of cooperation between safety engineers, industrial nurses, physicians, management and labor, if a complete health and safety program is to be maintained.

A strong public health program, along with the general industrial health program backed by educational facilities, was cited as the key to general health improvement in individual employees and reduction in essential manpower losses.

A feature of the meeting was the presentation of a life membership in the Greater Grand Rapids Safety Council to MISS NELLIE P. LAUBSCHER, supervisor of industrial nursing at the American Seating Company for 23 years, for her efforts in establishing the Council's industrial nursing section and for promoting industrial nursing locally. MISS LAUBSCHER founded the first aid department at the company, as well as the club for girls. She was one of the first industrial nurses in the area, and was also interested in the development of industrial relations counseling. Her training was received at Butterworth Hospital; she joined the staff of the American Seating Company in 1922. MR. E. ROSS FARRA, Council Manager, made the presentation.

PAT HOWARD, Chairman of the Industrial Division of the Council, presided. H. G. DYKTOR, of Lansing, President of the Michigan Industrial Hygiene Society, introduced the speaker.

New England Conference

NEW ENGLAND CONFERENCE OF INDUSTRIAL PHYSICIANS held its annual meeting at Boston, February 23, 1944, with an interesting program, which will be covered in detail in the May issue of INDUSTRIAL MEDICINE. The Conference voted to authorize the formation of a section in any of the states within the conference area where there might be a sufficient number of active members for such purpose, and where such members regarded the section desirable and locally advantageous. THE RHODE ISLAND SOCIETY OF INDUSTRIAL PHYSICIANS AND SURGEONS thereupon became the first component section of the NEW ENGLAND CONFERENCE.

Florida Association

FLORIDA ASSOCIATION OF INDUSTRIAL SURGEONS is holding its sixth annual meeting at St. Petersburg, April 13, in conjunction with the 71st annual meeting of the Florida Medical Association.

Central States Society

CENTRAL STATES SOCIETY OF INDUSTRIAL MEDICINE AND SURGERY is holding its annual meeting on Tuesday, May 16, at the Palmer House in conjunction with the 1944 convention of the Illinois State Medical Society. In the afternoon there will be a joint session with the Illinois Society's Section on Surgery.

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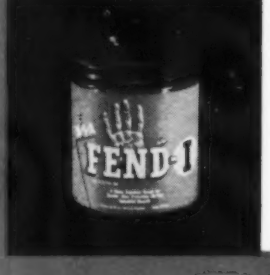
Protects against dermatitis from cutting oils of low water content, carbon tetrachloride, and other chlorinated solvents, kerosene and other petroleum distillates, vegetable and mineral oils. FEND-E water soluble Cream, like all FEND Creams, is easily applied, and readily removed at the end of each work period.

FEND-A

This water soluble cream protects against dermatitis from excessively staining and adhering compounds, such as in spray painting, pitch and tar, bitumastic paint, and dry metallic dusts. FEND Creams are rubbed well into the skin, care being taken to cover all exposed skin surface.

FEND-O

FEND-O provides safe barrier protection in handling gun powder and explosives (such as tetryl and T.N.T.), coal tar derivatives, wood preservatives, and solvents such as cold water, alcohols and acetone, without interfering with the normal action of the skin or skin glands.



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A water-repelling cream, FEND-I affords protection against dermatitis from strong acids and strong alkalies, cutting oils with over 10% water, formaldehyde, phenols, metals and metallic salts and constant immersion of hands in hot or cold water. Fend-I rubs in well, but leaves a slightly more oily film on the skin than Fend-E.

FEND-X

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Industrial Health

—Abstracts of Papers presented at the Sixth Annual Congress on Industrial Health, sponsored by the Council on Industrial Health, American Medical Association, February 15-16, 1944, Chicago—

Reported by
C. O. SAPPINGTON, M.D., Dr. P.H.

REACHING a high peak in attendance and enthusiasm, and replete with subjects of mutual interest for the many types of people concerned in industrial health, the Sixth Annual Congress on Industrial Health of the American Medical Association was much the best of all the meetings of this group.

Special features included a panel on Postwar Industrial Health; the State Societies Dinner and Round Table; a Symposium on Medical Service under Workmen's Compensation; and similar Symposia on the Rehabilitation and Re-employment of the Disabled, and on Women in Industry. A number of very impressive and interesting exhibits were also included in the activities of the meeting.

Tuesday Morning, February 15

DR. STANLEY J. SEEGER, in giving the report of the Council on Industrial Health, stated that this conference formed a basis for showing the enormous scope of industrial health and proving that its problems are not static and that neither science nor industry alone can solve them.

There has been a noticeable lag in the utilization of industrial opportunities by private physicians. Several factors are involved; one, the extremely rapid development of industry; another, the failure of proper education and training in preventive medicine and public health to the extent justified.

The relationship to laws has been greatly neglected; problems are presented without methods of control, and administration has been almost entirely ignored. The program of the Council seeks to overcome these difficulties. In this connection, it should be mentioned that the American Association of Industrial Physicians and Surgeons has done notable work in this field.

A very difficult and intricate problem exists in management relationships and with respect to hospital services. Real troubles have been the shift of the population, the shortage of physicians, inadequate transportation, and others.

It is the concern of the Council that the physician be the central figure in industrial health work, and thus it becomes essentially a home-town problem. Allusion was made to minimum requirements and the principles of industrial health work which have been repeated elsewhere and are well known.

There has been a great growth of medical group and clinical practice, but there is need for more diagnostic service, and the general practitioner is still important in this picture. However, the basic principles of organization are not too well understood, and a critical analysis is indicated.

In this respect, the principles of the Council as originally established were outlined. It is significant that a sane arrangement with labor seems brighter as to its ultimate accomplishment.

Studies on standing orders for nurses and also the report on physical examinations in industry represent distinct advances; it is believed that these will be important in their application to re-employment and rehabilitation.

The resources of the Council are available, both at headquarters and through the special committees in the various states, as well as the Association's sectional committees.

The following points deserve emphasis:

1. The physician should be the central figure in industrial health work.
2. Problems of service center around industry and can be solved only by going back to the "grass roots."
3. Organization and its facilities seem obscure in many industries, but this is not essentially a medical problem.

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4. Industry distinctly lends itself to a sound approach in industrial health.

5. The application of medical ethics should be clarified.

6. Progress is reported.

DR. JAMES E. PAULLIN, President of the American Medical Association, discussed "Industrial Health: A Restatement of Objectives," paying a tribute to the Council on Industrial Health in its scientific advance in all fields. It seems wise to review previous work and to contemplate further activities.

Physicians should concern themselves with (1) the prevention of diseases and injury through control methods; (2) the conservation of health through proper supervision and education; and (3) medical and surgical care for the purpose of restoration. Anything less than these principles is not adequate, and more would be to infringe on private practice.

How can we stimulate the latent interest?

1. Industry should prove an ample basis for advancement; there should be no subordination of the physicians to the best interests of the patient. Industrial medicine and health work should be encouraged to reach its full stature; industrial medicine and health should be taken off the bargain counter.

2. There should be provision for trained personnel; a duty is imposed on medical educational facilities. All physicians should have a sound background of industrial health. There should be afforded satisfactory consultation in industrial hygiene and the clinical specialties. It is vital that the relationships of the industrial and private physicians should be encouraged and fostered. Reference was made to the report of the combined Committee on Medical Education of the American Medical Association and the American Association of Industrial Physicians and Surgeons.

Tuesday Morning, February 15

REPORT of the Council on Industrial Health, STANLEY J. SEEGER, M.D., Chairman, Texarkana, Texas.

"Industrial Health—A Restatement of Objectives," JAMES E. PAULLIN, M.D., Atlanta, Georgia, President, American Medical Association.

"Preventive Medicine: The Key to Victory and World Recovery," JAMES STEVENS SIMMONS, Brigadier General, USA, Washington, D. C. Office of the Surgeon General, U. S. A.

PANEL—Postwar Industrial Health, Moderator: R. L. SENSENICH, M.D., South Bend, Indiana:

Participants:

HARVEY BARTLE, M.D., Philadelphia, Council on Industrial Health; President, AMERICAN ASSOCIATION OF INDUSTRIAL PHYSICIANS AND SURGEONS.

SIDNEY R. GARFIELD, M.D., Oakland, Calif. Permanente Foundation Hospital.

W. P. JACOB, Long Island City, National Association of Manufacturers.

NEVILLE PILLING, Chicago, Chief Executive, Zurich Insurance Companies.

J. G. TOWNSEND, M.D., Bethesda, Maryland, U. S. Public Health Service.

ROBERT J. WATT, Washington, D. C. International Representative, American Federation of Labor.

Tuesday Afternoon

LEVERETT D. BRISTOL, M.D., Presiding:

"New Developments in Occupational Medicine—Aviation." DAVID N. W. GRANT, Major General, Washington, D. C., Air Surgeon, U. S. A.

"An Institute of Industrial Health—Plans of a Proposed Development in the Medical Science Center of Wayne University." EDGAR H. NORRIS, M.D., Detroit, Dean, Wayne University College of Medicine.

"A Visual Service for Small Manufacturing Plants." HARRY S. GRADLE, M.D., Chicago.

"Medicine, Labor and Industry Join Hands in Philadelphia," CHARLES-FRANCIS LONG, M.D., Philadelphia, Chairman, Commission on Industrial Health and Hygiene, Medical Society of the State of Pennsylvania.

"The Conquest of Tuberculosis in Industry," HERMAN E. HILLEBOE, M.D., Washington, D. C., Senior Surgeon, Medical Officer in Charge, Tuberculosis Control Section, States Relations Division, U. S. Public Health.

Tuesday Evening

STATE Societies Dinner and Round Table, ANTHONY J. LANZA, Lieut.-Col., MC, USA, Presiding:

An informal dinner and round table discussion intended primarily for the personnel of committees on industrial health in state and county medical societies.

Wednesday Morning, February 16

CLARENCE D. SELBY, M.D., Presiding:

"The New Movement in Industrial Sanitation," MOHE H. SOLWORTH, Louisville, Kentucky, Sanitation Consultant, Joseph E Seagram & Sons, Inc.

"Health Education for Industrial Workers," W. W. BAUER, M.D., Chicago, Director, Bureau of Health Education, American Medical Association.

"Maladjustment in Industry," FRANK F. TALLMAN, M.D., Lansing, Michigan, Director of Mental Hygiene, State Hospital Commission.

"The Story of Penicillin," CHESTER S. KEEFER, M.D., Boston, Chairman, Committee on Chemotherapy and Other Agents, Division of Medical Sciences, National Research Council.

"The Detection and Treatment of Malnutrition among Industrial Workers," TOM D. SPIES, M.D., Cincinnati, Associate Professor of Medicine, University of Cincinnati College of Medicine.

Wednesday Morning

SYMPOSIUM on Medical Service under Workmen's Compensation, RAYMOND HUSSEY, Lieut.-Col., MC, USA, Presiding:

"Medical Developments in Workmen's Compensation—1943," J. W. HOLLOWAY JR., Chicago, Director, Bureau of Legal Medicine and Legislation, American Medical Association.

"The Interdependent Problems of the Administrator and the Industrial Physician," MRS. EMMA SANBORN TOUSANT, Boston, President, International Association of Industrial Accident Boards and Commissions.

"Disability Evaluation: The Solution in Wisconsin," VOYTA WRABETZ, Madison, Chairman, Industrial Commission of Wisconsin.

"Is the Present System of Occupational Disease Coverage Adequate?" RUTHERFORD T. JOHNSTONE, M.D., Los Angeles.

"Second-Injury Funds," J. DEWEY DORSETT, New York City, Assistant General Manager, Association of Casualty and Surety Executives.

"Supervising Standards of Medical Service for the Injured Workman," D. J. GALBRAITH, M.D., Toronto, Vice-Chairman, Ontario Workmen's Compensation Board.

Wednesday Afternoon

SYMPOSIUM on the Rehabilitation and Reemployment of the Disabled, HENRY H. KESSLER, Commander, MC, USN, Presiding:

"The Present Status of Rehabilitation in the U. S. Army," FRED W. RANKIN, Brigadier General, U. S. Army, Washington, D. C., Chief Consultant in Surgery; and W. E. BARTON, Major, MC, Washington, D. C., Director, Reconditioning Division.

"Vocational Training and Placement of the Veteran," C. E. HOSTETLER, Hines, Illinois, Vocational Rehabilitation Officer, Veterans Administration Facility.

"State Plans for Rehabilitation," MICHAEL J. SHORTLY, Washington, D. C., Director, Office of Vocational Rehabilitation, Federal Security Agency.

"The Place of the Compensation Insurance Carrier in the Field of Rehabilitation and Re-employment of Disabled Servicemen," B. E. KUECHLE, Wausau, Wisconsin, Vice-President and Claim Manager, Employers Mutual Liability Insurance Company of Wisconsin.

"Current Developments Affecting the Physician's Role in Manpower Utilization," CLIFFORD KUH, M.D., Richmond, California, Permanente Hospitals, Kaiser Shipyards; and BERT HANMAN, San Francisco, Regional Staff, War Manpower Commission.

"Community Organization for Rehabilitation and Reemployment," HAROLD VONACHEN, M.D., Peoria, Illinois, Medical Director, Caterpillar Tractor Company.

Wednesday Afternoon

SYMPOSIUM on Women in Industry, Arranged by the Committee on the Health of Women in Industry, Section on Obstetrics and Gynecology, American Medical Association, H. CLOSE HESSELTINE, M.D., Presiding:

Report of the Committee on the Health of Women in Industry, H. CLOSE HESSELTINE, M.D., Chairman, Chicago.

"Protection for Industrial Women: Progress and Prospects," MISS MARY ANDERSON, Washington, D. C., Director, Women's Bureau.

"Why Do Women Stay Away from Work?" C. O. SAPPINGTON, M.D., DR. P.H., Chicago, Industrial Health Consultant.

"A Practical Industrial Health Program for Women," FRED B. WISHARD, M.D., Anderson, Indiana, Medical Director, Delco-Remy Division, General Motors Corporation.

Discussion Leaders:

MAX BURNELL, M.D., Flint, Michigan, Medical Director, AC Spark Plug Division, General Motors Corporation.

FREDERICK H. FALLS, M.D., Chicago, Professor of Obstetrics and Gynecology, University of Minnesota Medical School.

JENNINGS C. LITZENBERG, M.D., Minneapolis, Professor Emeritus of Obstetrics and Gynecology, University of Minnesota Medical School.

GOODRICH C. SCHAUFFLER, M.D., Portland, Oregon, Associate Clinical Professor of Obstetrics and Gynecology, University of Oregon Medical School.

Exhibits

TREATMENT of Minor Burns. ROY D. MCCLURE, M.D., and CONRAD LAM, M.D., Detroit, Ford Hospital. An evaluation of treatment methods.

2. Cutting Oil Dermatitis. Committee on Occupational Dermatoses, Section on Dermatology and Syphilology, A.M.A. Causes, prevention and medical management of oil folliculitis. Desirable properties of detergents and protective creams.

3. Industrial Noise and Hearing Loss. Council on Industrial Health, A.M.A.; Council on Physical Therapy, A.M.A.; Committee on Air Conditioning, A.M.A. (a) Analysis and Interpretation of Noise in Industry; (b) Control Methods; (c) Placement and Rehabilitation of the Hard of Hearing.

4. The Peoria Plan for Human Rehabilitation. HAROLD A. VONACHEN, M.D., Peoria, Caterpillar Tractor Company. Successful community cooperation in rehabilitation.

5. Industrial Hygiene Services. Division of Industrial Hygiene, U. S. Public Health Service, Washington, D. C. Growing demands for investigation and consultation call for expanded industrial hygiene services.

6. Siderosis of Welders. O. A. SANDER, M.D., and NORBERT ENZER, M.D., Milwaukee. Roentgenologic and pathologic observations of welders' lungs.

7. Silicosis. Council on Industrial Health, A.M.A. Presented as contrast to pseudonodulation of welders.

8. Floor Plans for an Industrial Medical Department. C. F. SCHRAM, M.D., Kingsport, Tennessee. Efficient use of space and facilities.

9. A Program for Industrial Health and Safety. Cleveland Health Museum, BRUNO GEBHARD, M.D., Director. Essential elements in industrial health and safety education.

10. Cardiovascular Pathology. JAMES M. CARLISLE, M.D., Rahway, New Jersey.

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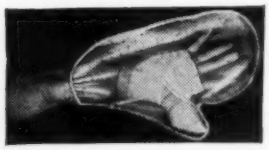

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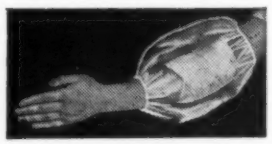

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3. Training in health education needs stimulation; organized labor can be of considerable help here. The Council should redouble its efforts to bring about all persons interested together.

Finally, there is great need for an arrangement of available services without paternalism or other types of socialized methods.

BRIGADIER GENERAL JAMES S. SIMMONS spoke on "Preventive Medicine: The Key to Victory and World Recovery."

Rapid mobilization has been accomplished because of the use of preventive methods which will figure materially in victory. The rapid development of public health since 1900 has contributed greatly to our present facilities. A vigorous application of these will be effective both during the war and in civil life.

Let us re-examine the aspects of national health progress which have made possible a higher standard of health than ever before. These were based primarily upon bacteriology and preventive medicine. A history of various methods was reviewed, including vaccination, quarantine, and others. In the beginning, there was no national health organization. The modern era began in 1871 with the organization of the American Public Health Association. Governmental recognition has been in force since 1909, and consequently military preventive medicine was developed. Many organizations were mentioned as contributing to our present situation, which has been responsible for bringing the army death rate to its lowest point during the last decade.

Although it is difficult to get trained personnel, cooperation with the U. S. Public Health Service and the state health departments has helped materially. Many specially trained persons have been necessary, and many persons have applied, although relatively few were found to be acceptable. This necessitated a gigantic training program; almost 30,000 persons have taken special courses in various fields. It is obvious that rapid methods are not adequate and the regular methodology should be resumed in the postwar period. Preventive medicine will figure very prominently here.

In conclusion, preventive medicine may be able to control the worst disease—war.

IN THE PANEL on Postwar Industrial Health, the moderator, DR. R. L. SENSENICH, introduced each speaker and indicated certain points to be covered by each one.

DR. HARVEY BARTLE spoke on how health services could be made to work in better fashion and also the application of these services in the postwar period.

In discussing this unique and practical subject, the essentials of industrial health were read from a previous publication of the Council.

The American medical profession must be able to lead management and labor in a real program. For this, refresher courses are greatly needed.

An increase in the space devoted to industrial medical activities in industry indicates a changed attitude on the part of industrial groups. The appearance and decorum of medical personnel are of great significance.

Rehabilitation is not new, but we have new superprograms; in these, we should not lose the personal angles.

It was indicated that the profession must face a huge task, and that preventive medicine is the most important phase of the work.

Compensation cases present a most distressing problem; the solution may lie in a per capita assessment to prevent difficulties.

Lantern slides were used to review various types of examinations, including the mental hygiene aspects, and to show floor plans of medical departments and requisites of personality, intelligence and other personality characteristics.

MR. W. P. JACOB was assigned the subject "Is Industry Willing to Support or Establish an Industrial Health Program, and What of the Economic Side?"

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a Committee on Industrial Health in 1937 for the thorough study of the problems involved. In 1940, the Association started a series of industrial health clinics, which were represented by meetings in various parts of the country. The Association has also published and distributed a number of brochures and pamphlets on this subject.

Collected figures show that of 166,794 establishments, only 241 had over 2500 employees and 77 had 1000 to 2500. But no discrimination has been made because of size—in fact, a serious effort has been made to impress the small organizations with the economic importance of industrial health services.

Especial reference was made to the most recent booklet of the Association entitled "Health on the Production Front."

In conclusion, it was emphasized that progress in industrial health work on the part of all concerned must be on a voluntary basis, as well as on a cooperative foundation.

MR. ROBERT J. WATT addressed himself to the questions: (1) Will labor support industrial health work and what other factors need consideration besides the promotion of health education? and (2) Has employee participation been successful?

Labor will support any plan which is practicable.

Figures from the National Health Survey show that there is an enormous number of persons sick and disabled, and also we know that there are many rejected by the military services. The cost has been estimated at four million dollars a day for sickness. Possibly this could be handled by contributions commensurate with income. There is general agreement on prompt diagnosis and treatment, but there are many obstacles in obtaining them. There is also general agreement on health programs by labor, but they need the cooperation of the working group—seldom getting it, however.

The long struggle with reference to compensation cases and occupational disease cases is not yet won. The workers want a plan that provides payment on a periodic basis, and consistent with good medical practice.

Industrial casualties greatly exceed war losses and, because coverage is inadequate, many will be cast aside. A joint effort would afford great relief from suffering, disability and time losses, and provide rehabilitation measures.

Labor wants no system of insurance or dole but does desire a practical program on a full-time basis, devoid of the business aspects. Labor greatly needs the physician's help and his best skill.

DR. J. G. TOWNSEND discussed the questions: (1) What are the Division of Industrial Hygiene plans? and (2) Will governmental hygiene agencies continue to contribute to the financial support of state activities as at present—in the postwar period?

For the answers to question No. 2, DR. TOWNSEND believed that one should consult the oracle, but the probabilities are that the same amounts as contributed by Federal agencies at present for the purpose of state activities will not exist in the postwar period.

A review of the U. S. Public Health Service industrial hygiene activities was given, stating that there are 500 persons who are loaned to the 38 state divisions at the present time. A manual of industrial hygiene was published in 1943. The placement of handicapped personnel has been cooperatively arranged through the Civil Service Commission, and the present rehabilitation plan will have considerable effect in the postwar era.

The following points seem important:

1. Continuation of the present work of coordination of industrial hygiene activities.

2. The development of statistics for the determination of need of services and their evaluation.

3. The establishment of industrial hygiene services in the 10 states not now having such services, and also an increase in staffs where the services are going on at the present time. A definite tendency to decentralization is apparent with the expansion of work in small plants, and in nursing activities.

4. The stimulation of university teaching of industrial hygiene courses for more persons of all kinds.

5. The improvement of legislation with reference to occupational diseases and the inauguration of state codes for maximum allowable concentrations of toxic substances.

6. Provision for medical care by coordination of community facilities.

DR. SIDNEY R. GARFIELD was asked to discuss (1) a description of the Kaiser plan and its essentials; (2) the applicability of a plan when the present emergency is past; and (3) is such a plan a bulwark against Federalized medicine?

Services for groups are not necessarily limited to industry. In the historical development of services, industry has done well, but non-industrial services have not been done as well. It has been found, for example, more necessary to consider non-industrial problems than industrial, there being very many of the former. The proportion cannot be worked out on a 50-50 basis for the industrial and the non-industrial.

It is believed that industrial medicine lags when solely restricted within the walls of industry. People have a desire to work and to continue to work even if they are not physically or mentally perfect, and this, it seems, is the justification of the present program of rehabilitation. Industrial medicine should be construed as a unit of undivided service and possibilities.

The Kaiser plan, therefore, has (1) accepted the challenge to provide for the worker and his family; (2) has attempted to keep the cost on a practical basis; and (3) has provided a practical economic program which will benefit alike the hospitals and physicians, even if the worker never becomes disabled. The plan has stood the test of a 10-year trial, needs no endowment, no charity, and provides proper income for physicians. The plan existed before the emergency, and it is believed that the recipients of its benefits get more care than the Wagner Act could possibly provide.

For the postwar era, it is believed that there should be (1) a health plan operated by physicians; (2) insurance provisions paying weekly compensation for injury or sickness in all persons; and (3) an insurance plan providing for death benefits.

Such a plan would do away with a great deal of argument, disagreement, and dissatisfaction; moreover, it places the responsibility where it belongs, with the insurance company. Both labor and management should be able to cooperate in such a plan.

MR. NEVILLE PILLING concluded the panel, discussing the following phases: (1) What opportunities are there for insurance companies in the postwar period; (2) Is it the function of the insurance company to induce small plant managements to take better care of the health of employees? (3) What are the opportunities of the insurance company in the field of health education? and (4) Can medicine, labor and insurance devise a plan which will make it unnecessary to expand present socialized tendencies?

MR. PILLING restricted his discussion to the question concerning the opportunities of insurance companies with reference to health education in industry.

It is believed that no type of agency has a better opportunity than casualty companies to do this job on a national scale; moreover, it seems good business for them to render such a service to their patrons because of the salutary effects for both management and labor.

Available statistics show that the average loss annually due to occupational absences is 0.6 day, while for non-occupational disabilities it is 8.8 days. Therefore, much depends on influencing the habits of living of the working population. However, the real value lies in the conservation of men and money.

Insurance companies must serve both labor and industry in order to do a good job of protection. The health of the worker and his family becomes vital to both labor and management, and the problem will become more serious, owing to the increase of old age difficulties, and therefore must be faced by management. The first and foremost consideration of any health program in industry therefore becomes continuous and practical health education. Mea-

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sured from any angle, the results justify the means.

Good health can be sold to workers, and industrial organizations present a fertile field for this sale.

Examples were given of favorable response and results with respect to dental clinic services, tuberculosis case-finding through x-ray films and skin tests, and also with reference to the problem of diabetes.

It is believed, therefore, that the opportunity for insurance companies in the prevention of disease and accidents in industry is a tremendous one throughout the nation.

Tuesday Afternoon

MAJOR GENERAL DAVID N. W. GRANT discussed "New Developments in Occupational Medicine—Aviation."

Consideration has been given to various problems, including anoxemia, cardiovascular studies have been made, there has been instituted a program of physical fitness including cardiovascular tests, and personnel problems and psychiatric conditions have been included.

A nine-weeks' course for flight surgeons has been given. They are instructed to watch carefully for signs of fatigue and other warnings of inefficiency; despite great care, many casualties have occurred. These are referred to a rehabilitation center for appraisal and rehabilitation for further duty or for civilian life. If the same plan could be used in industry, there would be less human loss.

It is believed that the present aviation program offers a real pattern for industrial application.

DR. EDGAR H. NORRIS presented a plan for "An Institute of Industrial Health: Plans of a Proposed Development in the Medical Science Center of Wayne University."

The dictum was expressed that only those having experience really count. The speaker had been previously injured and had drawn compensation and he was also a surgeon for a casualty company. External and internal knowledge of industry is a *sine qua non* for health work in industry.

The proposed project is a huge one, involving 150 million dollars expenditure. Fortunately the exploratory stage is past and the plan is now in motion, a 50-acre site having been acquired.

There are many inadequacies in medical education with reference to industrial phases, which have been changed considerably for the better, and some phases of industrial health work have been approached. Curricula vary, but so far are somewhat stereotyped; there has been considerable objection to change of curricula, hence there have been no thorough courses in industrial health. This is to be expected, because society is characterized by stubbornness and inertia to change. Most changes are evolutionary, and come because of a fortuitous combination of people and events.

Detroit represents a basic industrial center and the faculty to be selected should not be bound by tradition, but should have vision and eagerness. It is believed that 12 to 15 hours of undergraduate work in industrial health should be given to provide an intelligent attitude.

There has been a definite shift to preventive phases from diagnosis and treatment elements, although this is not the theme in medical science. Provision should be made for the benefit of graduate students largely through intensive courses. Research must be done by independent thinkers; thus there must be individualized programs, and teaching and research must be associated.

The facilities should be housed in a building with small offices and small laboratories, and a considerable number of these should be provided for different phases of teaching.

Among the divisions and specialized phases are the following: (1) physical preparedness for industrial occupations; (2) physical examinations; (3) organization and administration; (4) economics and public relations; (5) medical and surgical relationships; (6) engineering, legal and insurance phases; (7) records and statistics; (8) graduate study; (9) continuation study; and (10) administration.

Industrial health has now become a professional entity in medical practice.

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RIASOL for PSORIASIS

An educational program becomes a prerequisite for application to specialty boards, and should become effective as a necessity. Traumatic surgery and treatment methods are now at a low ebb, but will be considerably emphasized after the war. Now is the time to develop the type of school as described and, with this background, we can intelligently advocate a national board and also special degrees on the basis of three years' work.

Law and engineering become important adjuncts, as also do safety, sanitation, and nursing, together with executive and personnel phases.

In no better way can we gain economic independence than through the putting of these principles into practice, through the organization of special faculties and the administration of sound courses. Our efforts in this direction must take definite shape in the months ahead in order to meet postwar problems.

DR. HARRY S. GRADLE presented "A Visual Service for Small Manufacturing Plants."

Recent statistics show that 15% of blindness has been caused from accidents, four-fifths of which occurred in industry. Figures also show that there are 20,000 blind persons in the country, 18,000 of whom became blind as the result of accidents of which 15,000 were industrial accidents. A two-and-a-half million dollar pension bill has been paid for the industrial cases. Accidental injuries causing partial or total blindness have never been appraised in a methodical manner.

The National Society for the Prevention of Blindness desires to aid small plants in Illinois with a visual service; this service has now been in effect for six months. Management is contacted and the details given in a short interview. A routing school is established, so that the foreman may send men for vision testing by means of the orthorater and with a minimum use of time. Special record forms are used. A survey of the illumination, both natural and artificial, is made of all jobs, and particular attention is paid to the occurrence of foreign particles, dusts, and other elements in the environment which might affect the eyes. Job analyses are made, showing visual requirements. Although there is a shortage of ophthalmology consultants, contacts are established and an optical service is also arranged. Hazards are spotted through the survey method and control recommendations afforded. A safety campaign among employees is instituted. The cost at the present time is $1.00 per employee, although this cost does not entirely cover the services.

Although the service is new, its appeal and also its available facilities can accomplish a great deal.

DR. CHARLES-FRANCIS LONG discussed the subject "Medicine, Labor and Industry Join Hands in Philadelphia."

In 1940 the A.M.A. plans were projected for committee work in the various states. The present report is an interim report.

First, the size of the problem was estimated and the number of available men with experience was obtained. A course of 48 hours with field trips was established at the medical school. This course was open to members of the state and county medical societies and nurses; 60 physicians were certified. There was also an industrial survey of the county by the industrial hygiene division, this being only 25% complete at the present time, but data are available on 1000 plants.

A reciprocal relationship was established between the Industrial Health Committee of the State Medical Society and the Chamber of Commerce Industrial Health Committee, exchanging members.

A list was made of the establishments, of which 178 had 500 employees or less, and a questionnaire developed. A two-page set of directions was formulated for the businessman approach, and employers were informed of the hours needed for service in their respective establishments; the proportion of two nursing hours to one physician hour was established. "In-plant" service was stressed for those organizations having 250 or more employees.

The plans included (1) use of general practitioners on an hourly basis; (2) use of full time physicians, of which there are only a few in Philadelphia; (3) provision for dispensary serving several small groups; (4) the use of a building in which several dispensaries were provided; and (5) a central dispensary for community use.

A series of three letters were sent to 178 small groups, followed by enlisting the interest of the Chamber of Commerce, and a question-and-answer session.

Several industrial groups were visited by a two-man team, requests coming from 11, which expanded to several more later.

Contacts were also made with the AFL, the CIO and the Railroad Brotherhoods with respect to plans.

It is believed that rehabilitation will accelerate the need for physicians—that this will be the springboard.

In closing, Christopher Wren was quoted, "If you're looking for our monument, look around you."

DR. HERMAN E. HILLEBOE concluded the Tuesday afternoon session with the discussion of "The Conquest of Tuberculosis in Industry."

Control is accomplished by mass x-ray surveys. Use of 14 x 17 films has proved to be too costly, both of materials and men. Work was done with 35 mm. films, 4 x 5 films, and 14 x 17 paper. This method can also be extended to families.

About one-half of the deaths from tuberculosis occur in the 25 to 45 age group, and up to 35 years of age tuberculosis is the leading cause of death. Although there has been no general increase since the outbreak of the war, there has been a proportional increase of tuberculosis in certain critical areas.

The objectives of the tuberculosis control program of the U. S. Public Health Service include the following items: (1) mass x-ray service in war industries and for families of workers; (2) employment statistics and medical social work; (3) selective service cooperation for follow-up.

Preference was given to the larger war industries in these surveys. Each mobile unit consists of a medical officer, two technicians, a record clerk, and proper equipment. Seven hundred films can be made on one roll of 35 mm. film in one process. This is because of the development of the Morgan photo-timer which gives good consistency and simplifies mass work; because of this timer it is not necessary to measure the chest or set the controls. Further development is expected with the use of this timer. Moreover, sound practice demands the use of mass methods. A total of 117 establishments have been surveyed in 11 states, covering 560,000 persons, of which 5,648 showed some evidence of re-infection tuberculosis; 62% of these were minimal, 31% moderately adanced, and seven advanced.

Placement plans can be developed, based on the findings, but the only safe rule is careful clinical study.

Facts with respect to these surveys presented in their true light beget the cooperation of labor.

The community and industry should provide sheltered employment for those who are unable to carry on in their regular jobs; the English experience shows the practicality of this method. Community-wide planning is a requisite. The case load has doubled or trebled in certain communities.

The opportunity is now available for case-finding on 50 million persons who can contribute in the greatest amount to the nation's progress.

Tuesday Evening

THIS consisted of an informal dinner and round table discussion, primarily for the committees on industrial health in the state and county medical societies.

COLONEL A. J. LANZA, in presiding, called on various state representatives from Ohio, Rhode Island, New York, New Jersey, Wisconsin, West Virginia, Minnesota, Virginia, California, Canada, Connecticut, Iowa, Utah and Indiana.

Progress reports were given by these different representatives as to the industrial health committee activities in the various states mentioned.

Wednesday Morning, February 16

LIEUT.-COL. RAYMOND HUSSEY presiding officer, made a series of introductory remarks, including ideas to

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the effect that physicians should be consulted with respect to compensation legislation, and that laws should be reviewed every year.

MR. J. W. HOLLOWAY discussed "Medical Developments in Workmen's Compensation—1943."

The legislatures of 44 states were in session in 1943, and each one considered workmen's compensation legislation. The total bills submitted for consideration were 530. Arizona and Oregon have passed new laws. In the former, limited benefits were scheduled, there were special regulations concerning silicosis and asbestosis, and details of payment of compensation fees; the Industrial Commission is vested with the power to appoint a board of dust experts qualified by medical experience—the law is a so-called schedule law providing for 35 different types of disease-disability. Oregon passed a law providing full coverage defining occupational disease as one peculiar to process or trade, arising out of the occupation, election being optional by the workers; provision was made for a medical board appointed by the state, in consultation with medical school faculties and the commission.

Michigan and Minnesota amended their present laws, Minnesota providing for a medical board; this now makes a total of 15 states and the District of Columbia which have general coverage.

Four states are now studying the problems of occupational diseases—Kansas, Nevada, New Jersey, and Virginia.

In Delaware, application may be made to the commission by a worker for a change of physician. Tennessee provides for a panel of three physicians for selection by the worker.

In Idaho a panel is provided for controversial questions (three physicians), and there is also provision for a panel of six physicians for silicosis problems.

There is at present consideration of a Federal law introduced by Representative Toland, of California, to permit chiropractors to treat compensation cases; no action has been taken as yet. It is believed that such a law would lower present standards of practice.

MRS. EMMA S. TOUSANT presented the subject, "The Inter-dependent Problems of the Administrator and the Industrial Physician."

The vital part of the program is adequate medical supervision throughout, because the medical results determine the future earning capacity of the injured individual. It is, therefore, vital that the medical aspects be developed to their fullest extent. Why has this aspect been neglected? It is because the profession has little to say in the formation of laws. The American Bar Association early recognized the fundamentals, but left out the medical aspects and rehabilitation. The following items are important: (1) satisfactory safety programs; (2) simple procedures which permit of rapidly returning the worker to his former employment, or to one which he can do; and (3) an efficient rehabilitation program.

The greatest opportunity for the medical profession lies in the rehabilitation program.

Wisconsin is probably the most progressive of the states, having particular reference to the report of 1914 where, for example, it is stressed that it is more important to save an arm by expert treatment than to pay compensation.

The Massachusetts law preserves free choice of physician, which is the basic principle of private practice and must be preserved.

There are too few good men interested in industrial medicine, and it is unfortunate that it took a war to produce an awakening. Why use excellent methods for the soldier and for those in athletic sports and not for the worker?

An administrator must know the laws, must know the methods and tests, the poisons and chemical agents involved, and must use a good measure of common sense. The administrator furthermore depends upon the development of the medical aspects in a practical way for guidance.

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Some difficulties have presented themselves: (1) lack of confidence by the worker in the physician; (2) tendency of the physician to treat symptoms rather than causes; (3) the general tendency to do exploratory operations; and (4) the lack of stimulation in the worker that early return to work is the primary objective.

Industrial medicine is a specialty and should rank with others; the only way to the accomplishment of this objective is through proper education.

Organized medicine should sponsor courses in A medical schools, should also develop leaders in state and county medical societies, and should help and be willing to discipine its own members.

Restoration to normal capacity is the real objective, and should begin at the bedside. There should be harmony between the medical profession and the administrator, and this depends upon the development of the medical aspects to maximum efficiency.

DR. RUTHERFORD T. JOHNSTONE presented the question "Is the Present System of Occupational Disease Coverage Adequate?"

This question and what it involves are trite and there has been much applesauce concocted. There is no satisfactory solution thus far, but there is hope—industrial medicine has lost its adolescent bashfulness.

Let us consider (1) What is the present situation? (2) What is adequate coverage? And (3) What is an occupational disease?

The answers to the first two are fairly well known. Because there is considerable variation in methods, there is no adequate coverage. Not more than 40% actually show real coverage for various reasons.

It is believed that the schedule method is not the most desirable, although provision is established for additions to the law. Probably the all-inclusive system is not without its faults.

Neither is it to be believed that the lawyer for the carrier consistently denies the facts. Probably the truth is to the contrary.

The chief stumbling block probably is the incompetent physician, and the chief offenders are the frock-coats who will not soil their minds with the dirt of industry. A case in point was illustrated in the use of carbon tetrachloride in which it was alleged that the exposure was the cause of a heart condition. One of the physicians thought that he saw a statement to the effect that an acute exposure might cause auricular fibrillation in an assue of *J.A.M.A.* The truth was, however, that the patient had not been exposed and did not have any symptoms of carbon tetrachloride effects.

With respect to free choice, nobody would object if free choice could involve intelligence, experience and education.

It has been repeatedly said that an occupational disease cannot be defined; is there any reason that a similar statement cannot be made about other medical conditions? As a matter of fact, there are now authoritative data by which occupational diseases may be defined, and in their definitions there is more access to real etiology than elsewhere in medicine.

In summary, the following points should be emphasized: (1) complete coverage is desirable; (2) occupational diseases are definite clinical entities and, as such, are definable; (3) such vagueness and misunderstanding as do exist are because of disinterest.

Medical education has been stepped up considerably in this direction, but thus far there has been lack of a bold approach, which is needed. There should be joint effort to secure international principles, and there should be definitely associated together the medical profession and the insurance interests. We must play in the big league, and the time has come that we should win a few games. An aroused medical profession has met the almost impossible requirements of war conditions; cannot we do the same here in industry? We should begin to fight even those opponents who have an M.D. degree.

DR. VOYTA WRABETZ spoke on "Disability Evaluation: The Solution in Wisconsin."

The law is designed for speedy relief and emphasizes physical restoration.

Many disagree with the legislature, but this is no concern of the physician or the administrator. The cases must be adjudicated according to law.

Most questions involve temporary disability, based on ability or incapacity for the job. This requires confidence in the physician who needs sympathy and understanding and there must be frank discussion of the findings; fairness to the worker by all physicians is a cardinal point.

Permanent disability presents a more difficult problem; one must project the possibilities into the future; the kind of occupations and work involved are considerations.

The Commission believes in laws that are simple for the administrator to use, and, accordingly, schedules of disability and compensation for certain well-defined types of disability have been worked out in Wisconsin. For example, 250 weeks are allowed for the loss of an eye. It is possible to apply such a schedule in clear-cut cases of loss of function. Provision for less than total disability is made on the basis of proportionate loss of function. A simple method, for example, has been devised for estimating loss of vision.

Eventually landmarks were established for the sake of consistency and the list was published in *Wisconsin Med. J.*, asking for comments and suggestions for revision, subsequent to which there was a hearing. The list was adopted in 1930 and has materially reduced the necessity for compensation hearings, besides being a substantial guide for physicians and administrators.

This principle and its application have promoted the conversation of manpower of all kinds, and thus simplification is urged for other states in similar matters. It has been instrumental in adjudicating at least 85% of claims without a hearing, and has been an incentive for prompt and well-done reports.

MR. R. J. DEWEY DORSETT discussed "Second-Injury Funds." Experience with pre-existing disabilities made employment difficult because of the greater risk involved; a variety of decisions resulted, in some instances paying only for the first injury, some for the combination, but neither has been satisfactory.

Because of these experiences, special funds have been set up to which industries and insurance companies contribute, thus affording a more equitable settlement. Based on a specific sum for death without dependent, and others for loss of certain members, and still others on a percentage of premium receipts of the insurance company, these have functioned fairly well.

The limits vary in different states. Some provide for previous losses and losses of similar members; some have reference to partial disability, and some have reference to permanent partial. A number of states now have such funds. The last war has influenced the creation of these provisions.

Of course there have been some difficulties, and in some instances the probabilities have not been well investigated. Five states last year established second-injury funds, probably returning veterans being the stimulus; further extension of such funds will be made and should be made. Insurance companies intend to take all the proper steps in this direction.

DR. D. J. GALBRAITH closed the session with the discussion of "Supervising Standards of Medical Service for the Injured Workman."

In Canada, the people have complete confidence in the care of casualty cases, in fact more than in civil life; this confidence has been obtained by proved experiences, including expert performance and supervision.

In Canada the medical board has complete authority with respect to treatment; the board has its own staff for physical therapy, and does treatments in its own clinic. There is a full time staff of 11 men, a part-time orthopedist, an x-ray man, two part-time occupational disease men; the full time of five physicians is required for the problem of silicosis (with a referee board of three). Miners are examined and x-rayed yearly and a certificate given; treatment is rendered if expedient.

The most serious injuries are fractures. A whole hospital floor is devoted to these cases, and outstanding orthopedists and x-ray physicians are used; all films are sent to the board with a report. A miniature 3 x 5 is permanently preserved in the individual's file.

Incorrect diagnoses and treatment become the subject of confidential consideration, and a decision is reached as to further procedure. Thereby the prevention of bad results is accomplished, and months of disability are saved.

The board also examines and treats those who come of their own accord. Employees can ask for a rating for permanent and total disability and for attention therefor, for which is required a minimum of two examinations and a specialist's outside opinion. Ratings are also subject to revision periodically.

This service has necessarily experienced some curtailment because of the present times, but it continues in a very constructive capacity.

Discussion is welcomed with all physicians; anything less than the best treatment has been found to be impractical; conferences and possible changes are always feasible. The sole interest of the board is the welfare of the worker.

The main problem at present is the prevention of minor injuries becoming major disabilities, with reference to eye injuries, finger injuries, and neuroses. In this respect, fingers are more important than the femur, and malingerers are made, not born.

The result of this system has been more rapid return to work with peace of mind, the lessening of the occurrence of permanent disability, and a reduction of cost. The scheme has proved to be ideal for the medical profession, providing ample opportunity for consultation and scientific work without charity or expense to the worker. It has the support of labor, industry, and medicine.

Wednesday Afternoon

DR. H. CLOSE HESSELTINE opened the Symposium on Women in Industry with the report of the Committee on the Health of Women in Industry (American Medical Association).

The 1942 resolution was passed by the Board of Trustees to form a committee on women in industry. Significant data must be available on this subject, and reference was made to the report rendered January 5, 1943, on general material. Additional reports are to be issued periodically. A complete bibliography is to be prepared.

There has been considerable controversy as to what may be pertinent. Many conditions should be managed by the personal physician. Data are not readily available as to the relationship between occupation and gynecological conditions.

The committee must maintain a neutral position, and it is the hope of the committee that facts can be made available. Cooperation is greatly to be desired among all physicians. The experience of DR. BURNELL in Michigan presents a practical program.

If absenteeism can be brought down materially, and gynecological conditions can secure more able and earlier consideration, thus affording better placement, all efforts in this direction will be quite worth while.

MISS MARY ANDERSON discussed "Protection for Industrial Women: Progress and Prospects."

Consideration was given to observations of over 25 years' experience with a comparison of laws of a quarter of a century ago and those at present, particularly with reference to hours, fair labor standards, rest periods, and exemptions for the present emergency.

Industrial medicine and hygiene have made great strides and enlarged their facilities and staff. The various state divisions have shown much progress, as has also the U. S. Public Health Service. Moreover, there has been a change in the attitude of employers, and many new arrangements and facilities have been provided.

The problem of fatigue in women is understandable, what with women's domestic responsibilities. There should be a common sense approach concerning pregnant women workers, and a clear-cut policy should be established. Reference was here made to the pamphlets and brochures

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put out by the U. S. Department of Labor and the U. S. Public Health Service.

Progress has also been made with women employees concerning job modification, protective equipment, and provision for women counselors, the latter of which has great significance. There has been better placement, greater flexibility of transfer, and a great deal of overhauling of eating facilities.

The Women's Bureau has many inquiries concerning working conditions: noise, vibration, cold, heat, fatigue measurement, the susceptibility of women to industrial poisons, the limitation of the employment of older women. Now is the time to assemble the facts on these problems.

The role of the bureau is standardization and recommendations, and it desires to do so only on expert information obtainable.

DR. C. O. SAPPINGTON discussed the question "Why Do Women Stay Away From Work?"

The background for this present report, which is a preliminary report, was the Industrial Hygiene Foundation's Survey on "The Health Problems of Women in Industry," completed in 1943 and published in January, 1944, by the Foundation.

One must realize at the outset that there is considerable difficulty in getting adequate and sound statistics; few plants have any, and there is no standard method of recording in those which are available. However, until further development, we must use what we have.

Statistical data were presented from a group of plants in various parts of the country showing the causes for female absenteeism in different types of establishments.

Based upon recent employment experiences of 64,000 women in widely scattered plants and in different occupations, the following comments were made:

1. Employment separations of women show great variations in different establishments.
2. Women have long shown significantly higher rates than men for separations due to respiratory and digestive complaints, as well as other non-industrial diseases. The reasons appear to be psychological rather than physiological; women are by nature more conservative of personal health.
3. Judged by representative available data, lost time due to female disorders rates low in the scale of causes of separation from employment.
4. Women in industry, as we have observed them at close range, have done a remarkable job of adapting themselves; it is to their credit that industry has not had greater difficulties.
5. The chief causes of separations apparently represent problems of social and economic adjustment. Although medicine, management and the community may aid materially, these problems in the final analysis appear to be personal responsibilities.

DR. FRED B. WISHARD discussed "A Practical Industrial Health Program for Women."

Industry now presents a considerably altered labor situation; women have become a permanent factor in industry and will become more permanent in the future. Therefore, adequate plans are necessary in order to induce women to apply for employment, and also for their protection when employed.

There are two schools of thought with respect to clothing: one that this is a war job and it should be done in overalls; the other is what is known as the "Queen of Sheba" approach. Probably the middle road is the best.

Job specifications should be set up, and lists are now available showing that these can be applied in a practical way, it now being believed that 75 to 80% of jobs formerly done by men can be done by women.

To a man, a job is an end in itself, but to women it is another means to an end; consequently changes must be made with respect to cleanliness, control of noise, proper temperature and humidity, good rest room facilities, and other well known provisions.

Ordinarily women like repetitive and dextrous work. Women should not stoop repeatedly, and posture becomes

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important, particularly for women employees; sitting all the time is probably as conducive to ill-health as continuous standing and it is desirable to change. The height of tables and chairs is an important requisite; as are provisions for conveyors, and the segregation of women employees according to height for different jobs.

The design of machines should receive consideration, with the counterbalancing of presses, and the fitting of the woman employee to the machine.

Lighting surveys are in order, and they result usually in conditions which may be fairly easily remedied. The length of soldering irons becomes an important issue, and also the redesigning of other appliances and machines to lessen effort in women employees.

There is no real factory type of women employee; she must have reasonable intelligence and health and also willingness to work.

Aptitude tests represent a good approach, but in the main they cannot be applied efficiently at present. Evaluations can be made with reference to age, weight, size, alertness, and other factors.

Age differences come in for consideration, but previous experience and physical and mental condition are more important.

The marital status is important only with reference to child care.

The capacity to work is variable, as might be expected, but the same principles can be applied to women as to men, with reference to defects and deformities. We must be familiar with the work requirements to do proper and adequate placement, and adequate weeding out must be done, particularly with protection being the guiding principle.

Experience shows that eight hours is the best length of shift, with some differences with reference to night shifts.

Physicians should be familiar with the laws in their state with respect to these problems. Swing shifts should not occur more often than once in every three months, and thorough supervision is essential.

With reference to food facilities, enough time must be given for the employees to leave the workroom, wash, eat comfortably, and have a little leisure before going back to work. This means that 30 minutes and upward must be provided for the meal period. Cafeterias, dining rooms, or mobile canteens have been used successfully in combination.

It has been found practicable and wise to provide restrooms for those affected by dysmenorrhea.

With respect to pregnancy, the majority of pregnant women do not want to work. Some, however, conceal their condition, and this makes difficulties. It is believed that pregnant women should stop work at the fifth month. If the pregnant woman has a husband in the service, she is probably better off employed, but she should be properly placed. It is believed that pregnant women are more susceptible to poisons on account of their accelerated metabolism. Seniority is not to be terminated in certain persons; women should be permitted to return to work in one year.

It is best to have standardization as to uniforms if they can be made reasonably attractive, as well as safe.

There are certain forbidden occupations for women, and physicians should know the statutes in this respect. Although 26 states have no laws, practically all have some general provisions.

A practical health program for women has been outlined and the essentials covered.

Closing the symposium on women in industry, there was an informal panel, with DR. HESSELTINE as moderator, the three speakers participating with the discussion leaders, DR. MAX BURNELL, DR. FREDERICK H. FALLS, DR. JENNINGS C. LITZENBERG, and DR. GOODRICH C. SCHAUFFLER. Questions centered around all phases of the protection of women in industry, the selection and placement, counseling, specific medical services, and like subjects.

INDUSTRIAL HEALTH and DISEASE

A Cooperative Health Program

J. J. WITTMER, M.D.
Personnel and Medical Director,
Consolidated Edison Company of New York, Inc.,
New York

FIFTY years ago the health of employees was supposed to be pretty much their own business. An employer might be sympathetic toward sick employees, might send them home when ill, might pay their salaries for periods of time if they were ill and needed the money. But he looked upon these benefits as gifts, as they were, and did not feel much responsibility for the worker's health beyond providing a reasonably safe and healthful working environment.

Our company recognized early, however, that an employee should be physically fit for the work he was to do. For a job which required especially keen senses or a high degree of physical strength or stamina, we did not wish to use an employee who would create a hazard for himself or others, nor one who had some weakness unsuspected until it was aggravated. Our first doctors, then, were employed for just one purpose—the preplacement examination of newcomers and of employees being transferred to new types of work.

Once the doctor was installed, the demand for his services grew rapidly and logically. He was called upon to administer first aid, to treat emergency illnesses, to advise on hygiene and plant sanitation, and to examine other employees than those awaiting placement. The need for a comprehensive medical service became increasingly apparent, one of the chief reasons being the proverbial inability of the average person to provide funds for medical services. We found that many employees were inclined to neglect their health until they became seriously ill.

When the establishment of a medical service for employees came under consideration, the question arose as to how it should be financed. Should the company paternalistically pay all the expense? should it act as a collecting and organizing agency by means of which employees might provide for their own protection at their own expense? or should it participate with the employees in a cooperative effort to provide a well-organized health program? The third method was chosen.

An employees' association already existed for "social and fraternal" purposes; membership was optional, and the association was operated by employees and supported by both employees and management. The question of medical services was discussed with the officers of this association and an agreement was reached. The employees were very eager to have medical service added to their benefits, and agreed willingly to have some of their association's funds used for this purpose. It was understood that the medical service paid for and supplied was to be adequate and complete, but free of frills and fads.

The employees' organization, the "Mutual Aid Society," pays a fair part of the cost of the medical services, the exact proportion being determined by the amount available in a fund made of dues collected by the Society from each member according to his salary. The company contributes an equal amount.

All services are available to weekly paid employees who wish to use them. Monthly employees, because of their higher salary range, are given only the service available at any of our medical bureaus, described later. However, the company cooperates by making payroll deductions for all employees who wish to join a hospital plan, in which their families can also be included.

Our entire medical service is under the authority of a medical director and his assistants—all physicians in good standing. The medical staff includes physicians, dentists, nurses, pharmacists, and a masseuse, besides the clerical staff needed, all on a payroll or retainer basis. In addition, physicians attached to various hospitals treat our employees and receive payment for their services.

The medical services available are:

1. Physical examinations before transfer, retirement, or for special reasons.
2. Periodic examinations, including those for certain types of workers, such as men engaged in hazardous occupations.
3. Examinations requested by employees.
4. Examinations prior to return to duty, including routine fluoroscopy.
5. First aid for injuries or illness on the job.
6. Treatment for illness, either in one of the medical bureau offices, at a physician's private office, or at home.
7. Prescribed drugs are furnished.
8. Diagnosis and treatments by specialists.
9. Extensive x-ray and laboratory facilities.
10. Cooperation with employees' personal physicians and advice on home medical problems.
11. Physiotherapy service under the direction of a physician.
12. Dental diagnosis, treatments and restoration work.
13. Operations, medical treatments, and other services in hospitals.
14. The privilege of staying at our convalescent home under medical care.

In any of our eight well-equipped medical bureau offices, an employee may receive efficient, rapid, accurate, and thorough medical treatment. If his condition is serious or unusual, the doctor may refer him to a specialist or may order x-rays or laboratory tests made, without expense to the employee. If he needs medicine, the doctor gives him a prescription which he can have filled, free of charge, at one of our pharmacies.

These pharmacies, staffed by registered pharmacists, are located in five of our eight medical bureau offices. Our physicians are furnished with a written formulary, which includes a list of drugs available and which can be compounded from the National Formulary or the United States Pharmacopoeia. Any drugs or medicine stocked or used are those approved by the American Medical Association.

If an employee is ill at home, he may call his own physician if he wishes, or if he prefers, he may receive treatment, free of charge, from one of our district doctors. These doctors, engaged on a part-time basis, have been appointed from various sections of the city, but the employee

In Metropolitan Life Insurance Company's *Executives Service Bulletin*, 22:2, February, 1943.

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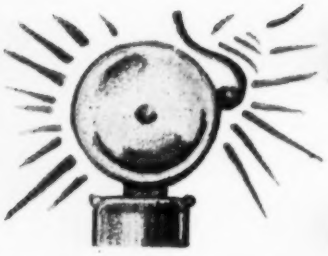

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has complete freedom of choice among the district doctors on our staff.

The district doctor treats the patient at home until he has recovered sufficiently to travel to the doctor's office. If the patient's condition calls for further consultation, the doctor so reports to the medical bureau and arrangements are made for a further and more extensive diagnosis. Either the district doctor or the doctors in the medical bureaus are able to arrange for hospitalization of an employee when necessary.

Laboratory Services Available

EMPLOYEES treated by their own physicians know that we are glad to cooperate with them by furnishing x-rays and laboratory work. An employee whose physician is not one of our staff may have x-rays or laboratory work done by bringing a letter from his doctor.

Employees may receive treatments from specialists in the medical bureaus or from other specialists in their own offices. These include genito-urinary specialists; rectal specialists; an internist; a cardiologist; tuberculosis specialist; surgical consultants; eye specialists; allergy specialists; ear, nose, and throat specialists; a skin specialist; a psychiatrist, and a specialist on circulatory conditions.

Our dentists, compensated on an hourly basis, are located conveniently in different parts of the city, and an employee chooses a dentist among those on our staff. The employee visits the dentist at his office, where all but emergency service is given after the employee's regular working hours. The amount of work done and the actual doing of it is left entirely to the dentist, except that we do not provide gold fillings, inlays, bridgework, or root-canal work. Our aim is to see that the employee has a functional mouth free of infection. The services are:

1. Emergency treatment between 9:00 A.M. and 5:00 P.M. on weekdays. 2. Extractions.
3. Silver, porcelain, cement, or alloy fillings.
4. Complete plates or partial plates when four or more molars are missing.
5. Prophylaxis.

The work of and the office of the dentist are periodically inspected by a dental supervisor and one of the assistant medical directors.

Members of the Society are accepted as ward patients in 10 hospitals of the four larger boroughs of the city and, in addition, for specific conditions, may be admitted to four other hospitals on whose staffs are some of our specialists. Employees are transferred to the hospitals by private ambulances.

The employee is cared for without charge in the hospital's general ward, with the use of the operating room, ordinary laboratory work, and x-rays. It is not our practice to underwrite the hospitalization of patients having tuberculosis, mental disorders, contagious diseases, or avoidable conditions.

If an employee who wishes hospitalization does not want to use one of the hospitals with which the Society has an arrangement, he may go into any hospital approved by the American College of Surgeons. He does not receive his physician's fee, but is reimbursed for hospital expenses up to a maximum of $4 a day. Members of the hospitalization plan may use that plan if they prefer, but they may not use both plans at the same time. However, after the period of hospitalization allowed by the plan has expired, the employee who needs further hospitalization is reimbursed by the Society up to $4 a day.

It should be noted that the care of compensation cases, industrial accidents, are not included in this plan.

A convalescent home for employees is maintained in the country about 65 miles from New York City. The home accommodates 85 patients under the supervision of a resident physician and registered nurse. All fowl, milk, butter, eggs, and cream, and most of the fruit, vegetables, and meat come from the 275-acre farm operated in connection with the home.

Safety and Plant Hygiene

IN ADDITION to the medical services provided for employees, the medical department cooperates closely with the safety department, and furnishes important general services. First aid is administered at 13 stations throughout the plants, by doctors or by designated employees well trained in first-aid methods. Also, the medical department is consulted on questions of plant hygiene, establishes conditions in the plants and buildings, and makes periodic inspection of all company premises. In this respect also it has value in keeping industrial hazards to a minimum, and thus it exercises a control over the accident rate.

The medical department keeps a confidential record for each employee, from which can be prepared medical statistics of value in the practice of preventive medicine and in the inauguration of safety provisions. As our medical staff cooperates with medical societies and industrial organizations, these statistics contribute to the knowledge of the medical profession generally.

The following statistics show the extent of the utilization of our medical service throughout a seven-year period:

Treatments in medical bureaus	108,861
Treatments by district doctors	56,546
Prescriptions filled	144,207
X-rays and laboratory tests	7,498
Dental treatments	45,111
Hospitalization cases	1,226
Convalescent home cases	758

During the time that our medical service has been in operation, our observations and statistics have shown a marked improvement in health conditions in a working force that now approximates 25,000 employees. Serious illnesses, such as tuberculosis and those due to toxic poisoning, have been reduced greatly. Our doctors no longer find the deplorable cases of neglect of teeth and eyes and the degenerative conditions due to tonsils or other foci of infection. Our absentee rate is well below the national average.

Our medical services are extensive and the employees use them extensively, but consisting as they do of essentials only, they are not a tremendous burden financially, either to the employees or to the company. All

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the services outlined can be obtained at a total cost for each employee of approximately $22 annually. Since employees contribute to the cost of the medical service, they feel that it is theirs to use, and both the management and the employees benefit by a sounder, healthier body of workers.

Gynecological Examinations in Industry

FORREST D. GIBSON, M.D.,
Medical Supervisor, Hamilton Standard Propellors Division,
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Now, that there are more than 15 million women employed in industry[1] it is more important than ever before that they be examined and classified according to their abilities to work without suffering undue physical impairment. The number of married women employed has steadily increased. A large proportion of these women have had children, with the result that they have pelvic disorders of such types and degrees as to make them even greater employment risks than is the case for non-parous women. The importance of devoting more careful attention to the placement of these women on safe jobs cannot be overemphasized. It would seem then that more attention could well be devoted to gynecological problems in the pre-placement physical examination programs.

A majority of the articles pertaining to gynecology in industry have contained only general recommendations. The results of only a few detailed gynecological examinations in industry have been published. Bradbury and Evans[2] made a study of 135 employees who presented gynecological complaints, and these investigators recognized the important aggravating influence of industrial work upon pelvic pathology. All except five of their cases had pelvic pathology prior to employment. Pommerenke[3] recommended periodic examinations of women with regard to gynecological symptoms and findings. Hesseltine,[4] in the committee report on the health of women in industry for the Section on Obstetrics and Gynecology of the American Medical Association, stated that pre-employment pelvic examinations were of value, in connection with other examinations, as bases for recommendations concerning proper job placement. He further recommended examinations for cystocele and rectocele in parous patients near or after the menopause.

In the United Aircraft Corporation, a great many of the jobs require various types of lifting. For this reason it was decided in October, 1942, that pre-placement pelvic examinations would be offered to parous women whose work would require them to lift weights greater than 15 pounds. The objectives of this procedure were to learn whether or not the applicants would raise any objections to this type of examination and whether or not pelvic examinations would be of value in the pre-placement examination program.

Prior to this study there had been a few cases of women with pelvic pathology who took the machine operator's trainee course for several weeks only to learn later that they were unable to do the lifting required in the operation of their machines and consequently had to be transferred to lighter work. These mistakes in proper pre-placement selection involved considerable loss of time and expense which might have been avoided had the workers received pelvic examinations before being selected for the training courses. Numerous other instances have been experienced where female employees seemed to have suffered as a result of being placed upon the types of jobs for which physical fitness could not be adequately evaluated without pelvic examination. Although the incidence of these disorders was not believed to be inconsistent with that to be found in other types of industries, it did appear obvious that pelvic examinations would have better enabled proper pre-placement evaluation of their physical fitness and, consequently, the prevention of many of these disorders.

Because of the large number of applicants examined during the period (approximately 13,000 men and 13,000 women), the gynecological examinations were limited to married females who had had children or gave histories suggestive of pelvic pathology and were being examined for work requiring some lifting. The primary interest was in the presence of cystocele, rectocele, or uterine prolapse, the presence of any one of which would justify light work being recommended to the employment supervisor. This type of interest was considered to be doubly important because many of the applicants were being considered for training in school where they would receive a five to six weeks' course of instruction on machine operation.

All the gynecological examinations were made by the writer. Preliminary selection of the women for examination was made by reviewing the general physical examination records and eliminating those giving negative histories of pregnancies or pelvic pathology. Of the married women who had had children and/or gave histories indicative of pelvic pathology, those selected for examination were approached on the subject. A total of 410 women were offered the service, and only three refused to accept it.

Gynecological Findings

THE gynecological findings on the 407 women examined are presented in the accompanying table. These women represented approximately 27% of the parous female applicants receiving general preplacement examinations during the period covered by the study. Only 143, or 35.1%, presented no disorders worthy of note.

The 264 women found to have pelvic pathology had 326 defects, or 1.25 per person. The type of defects and percentages involved are presented in following table:

Examination Findings	Number	Per Cent
Total Examinations	407	100.0
Number with no significant pathology	143	35.1
Number with significant pathology	264	64.9

	Number	Per Cent of Examinations	Per Cent of Defects
Classification of 326 Defects:			
Cervicitis	165	40.5	50.6
Cystocele, Rectocele, or Prolapsed Uterus	125	30.7	38.3
Pregnancy	13	3.2	3.9
Salpingitis	8	2.0	2.5
Carcinoma (suspected)	8	2.0	2.5
Myoma Uteri	7	1.7	2.2

The prevalence of cervicitis was 40.5% of the women examined. This represented 50.6% of the total defects. This high incidence was probably due to the number of parous women examined. These patients with cervicitis were all advised to see their private physicians for treatment. They were not deferred, but were allowed to work while this care was being received. The presence of cervicitis can cause backache, and usually causes leucorrhea. An infected cervix is a focus of infection, and leucorrhea can be a factor in lowering the morale of a worker.

There was a large incidence of cystocele, rectocele, and/or descensus uteri (30.7%). This number was approximately one-third of all the women given pelvic examinations, and represents 38.3% of the total defects. It was recommended that a majority of these women not be allowed to work on machines. They were required to sign waivers. (In Connecticut, whenever any person desiring employment has a physical defect which imposes upon his employer a hazard, it is permitted that the person sign a waiver of any rights to compensation for any personal injury arising out of and in the course of employment which may be attributable in a material degree to such physical defect.) The recommendations to the employment supervisor were that women with such defects be given either sitting jobs or work not requiring the lifting of more than 15 pounds. Thereby, these female applicants were handled in the same way as male applicants with actual herniae. Thirteen of the applicants were found to be pregnant, and one of these was hired for a three months' period of time in the office. The others were not taken for factory work.

Connecticut State M. J., March, 1944 (9:3, 189).

The incidence of myoma uteri, as well as salpingitis, was about what one would expect. For the women having salpingitis, light work was recommended. All of these cases were chronic, and were recommended for employment if the blood sedimentation rates were normal. There were eight cases with cervical lesions that grossly resembled carcinomas. These women were not allowed to work until carcinoma was ruled out by their own physicians.

Discussion

A MAJORITY of the applicants were pleased with the examinations. They felt that management was taking a real interest in their welfare as individuals and was trying to safeguard their health by placing them on jobs suited to their physical limitations.

In view of the above findings, it is considered just as important to do a pelvic examination of a parous applicant as to examine a male for hernia. In the United Aircraft Corporation, the incidence of hernia among males is 15%. The examinations afford an excellent opportunity to direct the patients who have unrevealed gynecological pathology to seek treatment. Otherwise, some of these cases might be overlooked. It is needless to point out that pelvic pathology is a common cause of chronic backache. In due time these workers with pelvic disorders might be spotlighted as being affected by heavy lifting and therefore become compensable.

On the basis of the above findings, it has been decided that gynecological examinations will be made a prerequisite for employment by the United Aircraft Corporation for parous women whose work will entail any lifting or any applicant who gives a history suggestive of pelvic pathology. This program will also include interval examinations. Should the applicant object to being examined by the corporation physician or gynecologist, she will be required to be examined by her private physician and return a report of his findings. The following routine has been found successful and will be carried out by the medical department of the corporation.

The history and general physical examination are completed in the usual manner. The applicant will then be told by the nurse or physician that, since the job for which she is being examined involves lifting or other strenuous activity, a pelvic examination also will be necessary in order properly to evaluate her fitness for the job. When explained in this way, very few applicants object. The patient is first examined for cystocele, rectocele, and the vulva is inspected. If there is a bulge visible at the outlet of either the anterior or posterior vaginal walls, or any degree of descensus, it is recommended that the applicant do no work requiring lifting of more than 15 pounds. The speculum is then inserted, and, with the patient straining, any descensus of the uterus is detected. At the same time the cervix and vagina are inspected for pathology. The findings are noted, the speculum is removed, and the bimanual examination is done to determine position, size, and contour of the uterus, and adnexal pathology is noted. If the patient has vaginitis or any suspicious lesions of the cervix, or other pelvic pathology, including menorrhagia and metrorrhagia, she is then deferred from work until she can show that she is being treated by her private physician. If pelvic inflammatory disease is found, a blood sedimentation rate is done, and the applicant is not allowed to work until the sedimentation rate becomes normal. Follow-up interval interviews or examinations will be done in order to determine that all such employees are receiving adequate care for the pathology that has been discovered, and for the care of which they were referred to private physicians. The entire gynecological program will be carried out under the supervision of a full-time gynecologist member of the medical staff.

Summary

FOUR hundred and seven pre-employment pelvic examinations were made at the United Aircraft Corporation to determine whether or not gynecological examinations should be required as a prerequisite for certain types of employment.

2. A large amount of pelvic pathology was found and has been discussed.

3. The plan adopted at the United Aircraft Corporation for gynecology in industry has been presented.

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American Optical Company's Health Department

—Annual Report—

IF THE physical condition of AO people of 45 years and older is an indication of the effect of war time working and living, they can feel that their health is staying up to par, as no significant changes have been indicated in the recent annual examinations of this group, according to the recently issued annual report of the AO Health Department under the leadership of DR. T. L. STORY, medical director.

This regular physical examination of employees has been a feature of the AO health program for many years, and is but one of the many activities conducted by the Health Department. As a result of these examinations the length of life of those who have had chronic illness has been increased through discovery of the chronic condition in its early stages.

Another indication of the continued good health of AO people is the fact that the number of services rendered by the Health Department dropped slightly in 1943, being reduced from 57,380 in 1942 to 55,589 last year.

In his report DR. STORY states that absenteeism as a result of sickness is less in AO than in most other large plants in the state. This fortunate condition is in part due to the fact that AO people report quickly and early to the dispensary any indications of sickness with the result that treatments are given at early stages, and in part to the general good health of the employees.

During 1943, accidents involving the loss of working time in Southbridge were approximately the same as in 1942, 33 last year as compared to 32 in the previous year.

One of the important health activities of a year ago was the Office and Plant First Aid groups organized and trained to meet the first aid needs of AO in the event of war damage. With the general relaxing of this type of activity throughout the state and nation, the First Aid organization, has been streamlined to about 100. It is the purpose to have this smaller group represent a permanent first aid organization within the plant, for emergencies that may arise.

Referring to the report current last year of the presence in some industries of keratoconjunctivitis, DR. STORY states that to date there have been no cases in AO, and it may be that this condition was over-emphasized to a certain extent.

In addition to the two dispensaries operated at the main plant and Lensdale in Southbridge, other dispensaries are now in full time operation at the Safety Equipment Service Company in Putnam and the Brattleboro plant. Work is now being carried on in the development of a similar first aid room in the Nomar plant.

With the Health Department in Brattleboro now slightly over one year old, the report states that 9,414 services were rendered during 1943, and that there were seven lost time accidents. Regular physical examinations are given new people in Brattleboro, as in Southbridge. The Putnam dispensary, which has been operating now for 17 months, having been opened in August, 1942, is also rendering regular services.

The Optical Service Department under the supervision of DR. C. H. CHEVALIER provides service to all AO employees.

Other activities of the Health Department include physical examina-

From *American Optical News*, March 10, 1944.

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tions of new people, sanitation and hygiene, fatigue, workmen's compensation cases, and the x-ray department.

A Dental Health Program for Industry

(As approved by Executive Council, of the Illinois State Dental Society, December 5, 1943)

AN INDUSTRIAL dental health program should provide emergency dental care; emergency treatment of industrial injuries and the oral occupational diseases. The program should also include the recognition, prevention and emergency treatment of dental sepsis, recognized as a major cause of non-occupational ailments and ill health among industrial workers, which results in time loss, absenteeism, fatigue, reduced efficiency, reduced physical fitness and mental alertness. This program should also provide for full and comprehensive dental health education.

PERSONNEL. Membership on the dental staff shall be limited to dentists who are: (A) Qualified in such fields as may be included with the service. (B) Acceptable to an Industrial Dental Committee of Illinois Dental Society. (C) Director shall staff his office with adequate personnel.

EQUIPMENT. Shall consist of such standard equipment as the dentist in charge deems adequate, and purchased under his supervision.

SCOPE OF SERVICE. (A) Complete diagnostic service (clinical and x-ray examination). (B) Emergency Dental Care. The emergency treatment of acute and painful dental lesions. Toothache, neuralgias, abscesses, gingivitis, trench mouth, stomatitis, dental sepsis, etc. (C) Emergency treatment of industrial injuries. (D) Recognition of oral manifestations of occupational and general diseases. (E) Dental health education.

POLICY. (A) The service should be an integral part of any general health program. Complete oral examination should be included in any compulsory physical examination prescribed by the industry. (B) The service should not include any restorative dental procedures. (C) All forms of restorative dentistry and extended treatment should be referred to the private practitioner of the employees' own choice. (D) Staff dentists shall not solicit the employee for any dental care at the staff dentist's private office. (E) The dental director shall be a member of all committees and a party to all conferences dealing with general health program of the industry.

COSTS. To be borne by industry. (A) No fee should be charged the employee. (B) All personnel should be on a salary basis. (C) Instruments and materials should be purchased by industry under direction of the dental director.

RECORDS. All records should be kept as complete and accurate as possible to enable management to determine, over a period of years, the value of the dental department. The minimum details of the records should conform to the State Health Department's uniform record requirements.

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when applied to burns, abrasions, anorectal conditions, wounds, varicose and decubitus ulcers, pruritus ani and vulvae.

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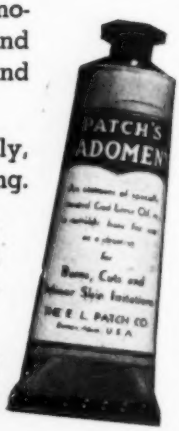

THE E. L. PATCH COMPANY
BOSTON, MASS.

Fellowship in Industrial Medicine

THE School of Medicine of the University of Pittsburgh announces that the James S. Kemper Foundation has granted $2,500 to the Department of Industrial Hygiene for the purpose of establishing a fellowship in Industrial Medicine. The purpose of the fellowship is to make available to a well-qualified physician the opportunity to pursue graduate work in preparation for a career in the field of Industrial Medicine.

[NOTE: Referring to the article "Use of Antigenic Substances," by DR. R. M. KREPPS, in INDUSTRIAL MEDICINE for March (page 235), the request was made that it be withheld for a future issue. The reason offered for this request was that the medical director felt that further study of this method of treatment should be made before the findings were summarized. The request, however, was received after the magazine had been printed, and too late for the article to be withheld.]

INDUSTRIAL HYGIENE SECTION

This Industrial Hygiene Section is published to promote sound thought upon and concerning industrial hygiene. To that end it will contain articles, discussions, news items, reports, digests, and other presentations, together with editorial comments. The editorial policy is to encourage frank discussion. On this basis contributions are invited.

Industrial Medicine

Reg. U. S. Pat. Off.

The Editorial Committee will exercise its best judgment in selecting for publication the material which presents most exactly the factors affecting industrial health and developments for control of potentially injurious exposures. The editors may not concur in opinions expressed by the authors but will endeavor to assure authenticity of fact.

The Science, the Law and the Economics of Industrial Health

Volume 5 | April, 1944 | Section 2

Teamwork

ONE HEARS much about teamwork between the Army, Navy, and Air Force on the battle fronts. The importance of cooperation in military operations is evident from our successes in the South Pacific, in Africa, and in Italy. The field of industrial hygiene is another that requires a great deal of teamwork, because of the large number of professions that are making contributions to better health, better morale, and better production in industry.

That there is teamwork among the workers in this field is evident from the WAR CONFERENCE ON INDUSTRIAL HEALTH to be held in St. Louis during the week of May 8. Beginning with its first annual meeting, the AMERICAN INDUSTRIAL HYGIENE ASSOCIATION has met jointly with the AMERICAN ASSOCIATION OF INDUSTRIAL PHYSICIANS AND SURGEONS. Last year the NATIONAL CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS met with us, and at St. Louis the AMERICAN ASSOCIATION OF INDUSTRIAL NURSES will also meet with us—making a total of four organizations convening jointly. This spirit of cooperation should be mutually beneficial to all of us. The contacts and acquaintances made at the meeting should be helpful in instituting and carrying out industrial hygiene programs in industry, and should encourage further cooperation among the various professions engaged in this field.

How about the attitude of those for whom this work is being done—labor and management? There are many indications that they are receptive to any contributions the industrial hygienist can make. This is a healthy condition, and one that should lead to complete cooperation of all interested parties.

These trends, fortunately, are not the result of the war, and therefore something to be discarded with the end of the war. They are a continuation of progress started during peacetime, and should continue without interruption after the war. There was no period of "conversion" for the industrial hygienist to enter the war program. With years of experience, trained personnel with the "know how" were able at a moment's notice to take over their new responsibilities. To go from plants manufacturing civilian goods to those producing military matériel was an easy step. The change-over from war to peace should also be easy for the industrial hygienist. However, this ease of shifting from war plants to plants producing civilian goods should not cause the industrial hygienist to overlook some excellent opportunities. Reconversion of industry to produce civilian goods will require many and major changes in plants and equipment. The industrial hygienist should be on the job and alert to the possibility of having his ideas for better working conditions incorporated when other changes are being contemplated. It is easier to change a blueprint than finished buildings or equipment.

These changes are in the future—how far we do not know—so at present our all-out efforts shall be to keep up production. The industrial hygienists have demonstrated the importance of their contributions to a world at war. When the time comes, let us demonstrate that we can make even greater contributions to a world at peace.

—H. H. SCHRENK, President,
American Industrial Hygiene Association.

Differences in Points of View

IN THE formulation of viewpoints concerning industrial health hazards and methods of their correction, differences of opinion develop depending upon the nature of the problem and the local conditions which have entered into the experience of separate investigators. In order to bring out a more complete picture of any situation, particularly where there may be some controversial aspects to it, communications to the editor concerning papers appearing in this publication are welcome. Elsewhere in this issue is a discussion concerning the relative emphasis which should be placed on ingested and inhaled radium in connection with radium painting operations discussed in the December, 1943, issue. It is just such discussions as this which permit formulation of well-balanced points of view and more effective control of industrial health hazards.

(Table of Contents on page 3.)

INDUSTRIAL MEDICINE, Industrial Hygiene Section: Official Publication of the AMERICAN INDUSTRIAL HYGIENE ASSOCIATION, H. H. SCHRENK, PH.D., President; J. J. BLOOMFIELD, President-Elect; EDGAR C. BARNES, Secretary; J. B. LITTLEFIELD, Treasurer: Published in January, April, July, and October: Editor, WARREN A. COOK: 605 North Michigan Avenue, Chicago.

Industrial Hygiene Problems

—in the Synthetic Rubber Industry—

FLOYD A. VAN ATTA and ALFRED M. NOYES,
Industrial Hygiene Division,
Illinois Department of Labor,
Chicago

BECAUSE the industry is relatively new in the United States there is much work to be done in evaluating and controlling the health hazards peculiar to the production and use of synthetic rubber. Control will be considered from an engineering approach only. Wherever possible, unsolved problems, which may be studied most effectively by those engaged in this industry, will be indicated. These studies should aim at the control of health hazards now as well as in postwar production of synthetic rubber. The economic value of industrial disease prevention has been emphasized by S. C. Sufrin, of the Rubber Products Branch of the War Production Board[3]:

"As an economist, I would like to point out that if the laboring people discover that certain jobs, although paying fairly good wages, cause the workers to become ill, the job opportunities are so great that those people leave and go to other jobs, which means a long breaking-in period with attendant interruptions to production. I know that several of the (synthetic rubber) companies have installed very expensive apparatus to pull off the fumes, but in many cases the systems either haven't been planned properly or haven't worked. That . . . . is the reason we are receiving complaints from workers that certain illnesses seem to follow working with these solvents . . . . we have to be very careful of our labor supply; and—even if from a purely selfish consideration of humanitarian demands —reduce to a minimum any of the ill effects of work in a particular job."

Those plants which have had a considerable turnover of labor in some departments and are puzzled as to the cause may find their answer in Mr. Sufrin's comments.

For lack of accepted terminology, "synthetic rubber" and "rubber substitute" will be used interchangeably in this discussion to indicate any of the synthetic materials which have rubber-like properties. The first part of the paper will consider the health hazards peculiar to the synthesis and handling of each of the more important substitutes, and the latter part will consider the hazards associated with a group of materials including accelerators, softeners, solvents, and other ingredients which are common to all of the synthetics.

Much valuable information is to be found in the two Industrial Safety Series pamphlets, numbers Ru-1 and Ru-3, published by the National Safety Council and based on the studies of Dr. L. J. D. Healy.[1, 2] These cover the potential harm of solvents, accelerators, pigments, etc. On May 29, 1942, the Division of Labor Standards of the U. S. Department of Labor called a conference in Akron on health hazards in the rubber industry. It was to be expected that the latest and most valuable information on health hazards peculiar to synthetic rubber would be found in the condensed proceedings.[3] Unfortunately, too much space was devoted to a "battle of experts" on the relative toxicities of two solvents; as a result, there is a minimum of information concerning other hazards, equally great, or greater. Whenever it comes to synthetic rubber, the transcript reads "off the record."

Based on a paper presented by the authors before the Rubber Section, 31st National Safety Congress.

The source material was assembled at a time when experience with the synthesis and fabrication of synthetic rubber in the United States was very limited. Furthermore, our being engaged in war and the close tie-up between synthetic rubber and military activities made it necessary to hold certain detailed information confidential. Rapid changes both in processes and in the materials being handled have modified and will continue to modify some of the specific data presented in this paper. However, the general principles of engineering control of potentially harmful gases, vapors and dusts, as outlined here, will apply to most operations connected with synthetic rubber. A section has been inserted just previous to the summary, listing some actual experiences by manufacturers and users of synthetic rubber in the health hazards and methods for their control. The bibliography has also been considerably augmented and brought up to date. MR. VAN ATTA'S present address is National Safety Council, Chicago.

Neoprene

NEOPRENE [9, 10, 13] was chosen as the first substitute to be discussed in detail because it has been used longer and there has been more experience with it than with most of the other substitutes used in this country. The chief potentially hazardous materials in the synthesis are the starting material—acetylene, vinyl acetylene, hydrochloric acid, and chloroprene. The following equations indicate the course of the synthesis:

$$\underset{\text{Acetylene}}{2\,CH\equiv CH} \xrightarrow[NH_4Cl]{Cu_2Cl_2} \underset{\text{Vinyl acetylene}}{CH_2=CH-C\equiv CH} + HCl \longrightarrow$$

$$\underset{\text{Chloroprene}}{CH_2=CCl-CH=CH_2}$$

Acetylene may be classified with the asphyxiant gases. In fairly high concentrations it has a depressant effect on the circulation and respiration and is somewhat narcotic. The few recorded cases of industrial poisoning have raised some doubt whether the harm was done by the acetylene itself or by the hydrogen sulfide or phosphine which it may have contained as an impurity. Whatever the source of harm, it is apparent that workers must be protected from breathing this gas continuously even in moderate concentrations.

Vinyl acetylene has not been studied as an industrial poison. It is probably more toxic than acetylene but should still fall into the asphyxiant group of gases.

Like many of the other chlorinated compounds, *chloroprene*, a liquid boiling at 59°C (138°F), is considerably more toxic than its parent hydrocarbon. Inhalation of comparatively low concentrations of the vapor causes irritation of the respiratory tract. Continued exposure may produce a fall in blood pressure, reduction in the respiratory rate and cyanosis. The most severe effects are damage to the liver, kidneys and testicles, and internal hemorrhage due to the hemolytic action. Von Oettingen[5] suggests that concentrations of 0.3 milligrams per liter of air, corresponding to about 100 parts per million, may cause toxic effects after continued exposure. The maximum safe concentration will therefore be somewhere below this value. Not only is chloroprene a respiratory hazard, but it may be absorbed directly through the intact skin and produce essentially the same effects that it does by inhalation.

Hydrochloric acid is a powerful respiratory and skin irritant. The vapor concentration in the workroom air must be kept well below 10 parts per million.

The various steps in the synthesis of Neoprene are carried on in closed systems and the materials handled through pumps and piping. Dangerous concentrations of air contaminants may be produced wherever leaks may occur and acute exposures are presented in cleaning out tanks, reactors and piping. One of the larger rubber companies has adopted the following precautions in the synthesis of Buna S[31];

these would apply equally to all syntheses in which toxic and highly explosive liquids and gases are handled:

"Escaping vapors must be removed at their source by exhaust ventilation. At the same time general ventilation must be provided at the rate of 20 air changes per hour.

Exhaust ducts should be located at points where vapors are likely to be released, such as valves, gauge glasses and similar locations and also in pits and other dead air spaces where vapors may collect.

Skin contact with the liquid should be prevented by proper protective clothing.

Safety rules for cleaning out pressure vessels cannot be too strict; the following precautions must be taken:

1. All valves should be closed and sealed unless a safety man is stationed at such points to prevent their being opened.

2. Any agitators or other moving equipment must be locked out.

3. Before entering any such vessel it must be thoroughly purged. This can be done by a combination of several of the following: filling the vessel with water, steaming, applying vacuum, and exhausting. Before opening such a vessel evacuate to as much vacuum as possible, bring to zero (gauge) pressure with nitrogen, and repeat this process a second time.

4. Workmen entering vessel must be provided with suitable safety equipment such as goggles, rubber gloves, and forced air masks.

5. Any extension light used must be of approved vapor-proof type.

6. The workman must wear a manhole harness with a strong lanyard attached and another workman must remain on the outside and retain hold of the lanyard. In some cases where the manhole is near the bottom of the tank it may be practical to omit the manhole harness but there still must be another workman detailed to the specific duty of observing the workman who is inside.

7. The workman in the vessel must be instructed to come out at the first indication of dizziness or illness and must be removed to clean air.

8. It must be borne in mind that the vapors of butadiene and many of the other materials used in these processes when mixed with air are highly explosive and all receiving, storage, and processing must be handled accordingly."[25]

Intelligent application of the precautions outlined above will reduce to a minimum the health hazards to which workers are exposed in the manufacture of Neoprene or other synthetics.

One of the proposed methods for polymerization of chloroprene is carried out with a 25% solution of the monomer in benzol, toluol, or similar solvent, then adding phenyl beta naphthylamine as inhibitor. Here there is a potential exposure to a combination of hazards, the most serious being the aromatic solvents and chloroprene vapors. The inhibitor, phenyl beta naphthylamine, has been considered in the past to be relatively slightly toxic. We feel, however, that exposure to this substance should be avoided because of possible long-range effects. Beta naphthylamine has been known to cause bladder tumors in dye workers; the addition of the phenyl group would probably increase its carcinogenic activity. A more recent method for polymerization of chloroprene treats the monomer in aqueous dispersion with lead oleate, followed by the addition of the above inhibitor. Here the new hazard of lead is present and special precautions are necessary to prevent inhalation of the dust and skin contact with the lead soap.

Buna Rubbers

THESE are the polymers of butadiene and its copolymers with styrene (Buna S) and with acrylonitrile (Buna N, Perbunan, Hycar, Ameripol, Chemigum). None of the simple polymers has been proposed for commercial production in this country, and of the copolymers, the Buna S will be produced in largest quantity.[9, 10, 14, 26]

The synthesis of butadiene is a problem for the petroleum[15] and alcohol industries, rather than for the rubber industry itself, but the connection between these industries must be very close in the future, if it is not already so. Therefore, some discussion of the synthesis is pertinent to this article.

The German process of starting with acetylene, condensation to monovinyl acetylene, and hydrogenation to butadiene is not being given serious consideration in this country. Most of our butadiene will probably come from petroleum—vapor phase cracking of petroleum; dehydrogenation of butane; and chlorination of beta butylene followed by dehydrochlorination. Another major source of butadiene in this country (and the chief source in Russia) will be alcohol, both from fermentation and synthesis. A third type of synthesis is the fermentation of corn by aerobacter aerogenes to give 2, 3 butylene glycol, esterification to the diacetate, then pyrolysis to yield pure butadiene:

$$\text{Corn} \xrightarrow[\text{aerogenes}]{\text{aerobacter}} \underset{\text{2, 3 butylene glycol}}{CH_3-CHOH-CHOH-CH_3} \xrightarrow{HAc} \underset{\text{diacetate}}{CH_3-CHOOAc-CHOOAc-CH_3} \xrightarrow{500^\circ C} \underset{\text{butadiene}}{CH_2=CH-CH=CH_2}$$

Styrene is ordinarily prepared from benzol and ethylene, with aluminum chloride as the catalyst, and dehydrogenation of the resulting ethyl benzene. Coal tar may also be used as the starting material.

$$\underset{\text{Benzene}}{C_6H_6} + \underset{\text{Ethylene}}{CH_2=CH_2} \xrightarrow{AlCl_3} \underset{\text{Ethylbenzene}}{C_6H_5-CH_2-CH_3} \xrightarrow{800\text{-}950^\circ C} \underset{\text{Styrene}}{C_6H_5-CH=CH_2} + H_2$$

Acrylonitrile may be prepared by any of the three processes shown in the following formulas. The method of choice in the future will probably be the third one, involving ethylene oxide and hydrogen cyanide, since it does not involve any chlorine.

$$CH_2OH-CH_2Cl + NaCN \longrightarrow CH_2OH-CH_2CN$$

$$KHSO_4 \longrightarrow \underset{\text{Acrylonitrile}}{CH_2=CH-CN}$$

$$CH_3COO-CH_2-CH_2-CN \xrightarrow{\text{heat}} CH_2=CH-CN + CH_3COOH$$

$$CH_2\overset{O}{\triangledown}CH_2 + HCN \longrightarrow CH_2=CH-CN + H_2O$$

Most of the raw materials and intermediates in these syntheses are highly toxic by inhalation and a number of them by skin contact also. The same precautions will be required generally as those recommended for the synthesis of Neoprene, in order to prevent illness and accidents among the workers.

What directly concerns the manufacturer of rubber substitutes is the materials he receives for polymerization.

Butadiene will be the most important from the standpoint of amounts handled in the industry. It is received as a liquid boiling at -3°C (26.6°F). One concern reports the following effects from exposure to the vapors:

"Irritation of the eyes, nose and throat, but apparently no cumulative effects. Below the lower explosive limit (2%) it is mildly narcotic, but in higher concentrations it is acutely dangerous."

There is very little information in the literature about the physiological effects of butadiene. The recorded observations,[6] which are mainly concerned with the effects of repeated heavy exposures, may

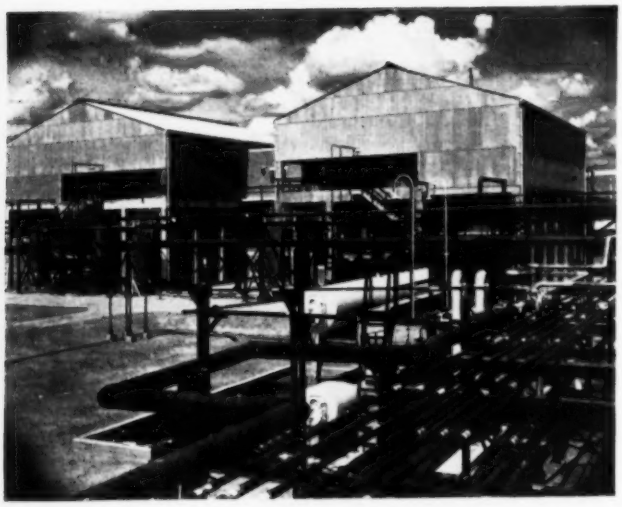

Fig. 1.
Reactor Area of Synthetic Rubber Plant
(Courtesy, Dayton Rubber Company)

have to be modified when there has been a more complete study of the effects of continued exposure to low concentrations. The low boiling point of the liquid should serve as a warning to avoid skin contact.

Styrene is a liquid boiling at 145°C (293°F). Its obnoxious odor would prevent a worker from voluntarily entering or remaining in a room where the vapor concentration is high. However, this cannot be relied on as a control measure because the sense of smell becomes dulled after prolonged exposure to even the strongly odorous vapors and gases. Exposure to styrene vapors may cause irritation of the skin and especially of the mucous membranes of the eye.[24, 31] The vapor is also narcotic in comparatively low concentrations. Irritation of the lungs, and liver and kidney damage will follow heavy exposures. Concentrations of 200 parts per million have been suggested tentatively as a safe maximum.

The role of personal cleanliness in prevention of skin irritation by contact with styrene is shown by the experience of one large rubber company that there were more cases of dermatitis among janitors than among operators in a Buna-S plant. The exposure of the operators was probably heavier than was that of the janitors, but much less difficulty was experienced in convincing the operators of the necessity for cleaning up immediately after any contact with the liquid.

Acrylonitrile is a liquid boiling at 78°C (172°F). The toxic effects of this compound are apparently due to the formation of hydrogen cyanide in the body after the material has been absorbed. Neal [21, 22] has found a typical cyanide reaction following absorption. Therefore, he has suggested a tentative safe limit of 20 parts per million. Acrylonitrile is by far the most dangerous material so far discussed and must be handled with extreme care. Since acute effects may follow even moderate exposures, anyone who shows the slightest symptoms should receive immediate medical attention. It is well known that cyanides are easily absorbed through the skin. For this reason skin contact with acrylonitrile must be avoided and accidental spillage on the skin must be immediately washed off with alcohol or large quantities of water.

Polymerization is usually carried out in a water emulsion, with the addition of soaps as emulsifying agents, catalysts (such as peroxides, persulfates or peracids), and modifying agents which may be halogenated hydrocarbons, nitriles or sulfur compounds. Some of the suggested modifying agents are trichlorpropionitrile, carbon tetrachloride, sodium cyanide, mercaptans. They are mostly substances of known high toxicity and must be handled with great care, that is, inhalation of vapors and skin contact with these materials must be prevented. The point of greatest danger is the removal of the modifying agents from the latex which they have helped to polymerize.

Constructions such as are shown in Fig. 1 will minimize the probability of the accumulation of dangerous amounts of vapor. Fig. 2, taken in the same area of the same plant, shows that even with construction specially designed to minimize vapor concentration there is still a necessity for ventilation. An area of this sort cannot be considered safe without special ventilation to remove the vapor which may escape from meters or fittings. The multiplicity of possibilities for the escape of vapor here will also emphasize the desirability of a regular program of air sampling even when it is thought that the ventilation is ample to remove any probable leakage.

Isobutylene Polymers

THE member of this group which will be commercially important is the copolymer of isobutylene with a diolefine such as isoprene or butadiene. This introduces the new hazard of butenes which are considered by some experimenters to be of about the same toxicity as butadiene. The butenes are colorless gases with boiling points between –6° and 2°C (21° and 36°F). We have no reason to believe that the control measures should be other than those recommended for butadiene. In polymerizing butene with diolefines to form Butyl rubber two highly volatile, flammable gases are being handled at the same time, which would make the fire and explosion hazard greater than with other copolymers thus far discussed. When isobutylene itself is polymerized the product formed cannot be vulcanized by present methods and therefore finds limited commercial application. Trade names for the isobutylene polymer are Vistanex and Oppanol.

Thiokols

THESE are made by condensing sodium polysulfide with chlorinated hydrocarbons.[19] Depending upon

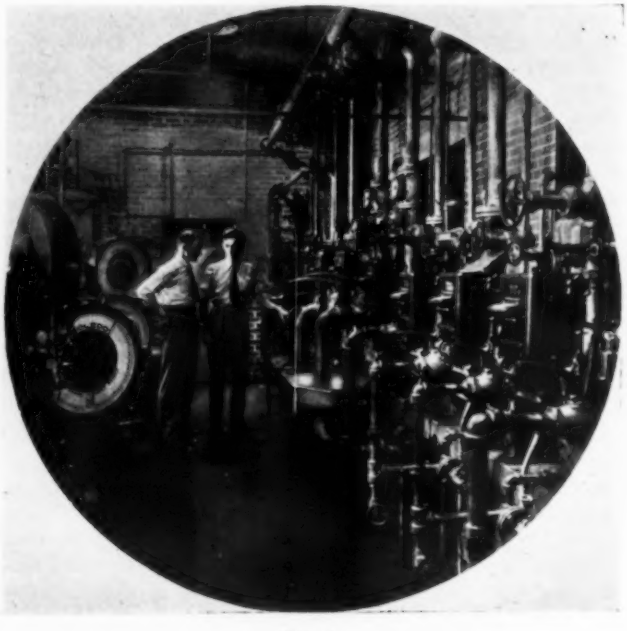

Fig. 2.
Metering Area of Synthetic Rubber Plant
(Courtesy, Dayton Rubber Company)

which chlorinated derivative is chosen, a variety of rubbery materials can be obtained. The two chlorinated derivatives most frequently used are ethylene dichloride and dichlorethyl ether, both highly toxic.

$$CH_2Cl-CH_2Cl + Na_2S_4 \rightarrow -CH_2-CH_2-S-S- + 2NaCl$$

Ethylene dichloride — Thiokol A

$$ClCH_2CH_2OCH_2CH_2Cl + Na_2S_4 \rightarrow$$

Dichlorethyl ether

$$-CH_2-CH_2-O-CH_2-CH_2-S-S- + 2NaCl$$

Thiokol B

Ethylene dichloride (dichloroethane) is a liquid boiling at 84°C (183°F), and is considered of the same order of toxicity as carbon tetrachloride. The suggested maximum permissible concentration for the vapors is 50 p.p.m.[29] Irritation of the throat, coughing and vomiting have been reported as initial symptoms in man. The possibility of liver damage and other effects of prolonged exposure to moderate concentration indicates the need for keeping the vapors out of the breathing zone of workers.

Dichlorethyl ether is a liquid boiling at 178°C (352°F). Its close relation to the war gas, dichlormethyl ether, suggests that it too may cause irritation of the eyes and lungs. One state has set a maximum permissible concentration for the vapors at 15 p.p.m. A concentration of 35 p.p.m. is said to produce a perceptible odor without producing irritation.[32]

Because the reaction takes place in aqueous medium and the product is coagulated with acid, the hazard of *hydrogen sulfide* must be considered in both parts of the process. Past experience has shown that hydrogen sulfide may cause irritation of the eyes, nausea, and headache, as well as loss of appetite and loss of weight when workers are exposed even to moderate amounts day after day. Therefore, hydrogen sulfide should be removed at the source of generation so that the concentration in the workroom air does not exceed 20 p.p.m. At least one article[18] has appeared in which the source of thiokol odors has been discussed. It is believed that *ethylene mercaptan* and other sulfur-containing compounds are formed. These may be highly toxic as well as disagreeable. If the hydrogen sulfide is removed at the source, mercaptans and the other toxic gases will be controlled at the same time.

Vinyl Polymers

Two of the most important members of this group[17] are polyvinyl butyral (Saflex) and polyvinylidene chloride (Saran). Common to all of these compounds is the hazard of acetylene, the basis for synthesis of the monomers. The monomer for polyvinylidene chloride is made by treating ethylene dichloride with alkali, by addition of hydrogen chloride to acetylene, or by substitution of chlorine in ethylene.

$$ClCH_2CH_2Cl + NaOH \rightarrow HOCH_2-CH_2Cl + NaCl$$

$$HOCH_2-CH_2Cl \rightarrow CH_2=CHCl + H_2O$$

Vinyl chloride

$$HC\equiv CH + HCl \rightarrow CH_2=CHCl$$

(Acetylene) — Vinyl chloride

$$H_2C=CH_2 + Cl_2 \rightarrow CH_2=CHCl + HCl$$

Ethylene — Vinyl chloride

Vinyl chloride is a gas at ordinary temperatures, with boiling point of -12°C (10°F). Fairly low concentrations may cause dizziness and confusion without previous warning.

Harmful materials involved in making other monomers and in effecting polymerization may include: hydrogen chloride, butyraldehyde, and several catalysts —mercuric sulfate, benzoyl chloride and uranyl acetate in methanol. The various processes are carried on in a closed system. Therefore, use of the precautions given previously for such handling—proper ventilation and avoidance of skin contact—should control the hazards.

Compounding and Vulcanization

The synthetic rubbers which will be most important commercially will be compounded and handled in much the same manner as natural rubber. This is more than a coincidence, for otherwise the available equipment of the rubber industry in this country would be useless. Likewise, the compounding ingredients are generally similar to those used with natural rubber. In the following sections these ingredients will be considered in groups.

Organic Accelerators and Antioxidants

Shortly after the development of accelerators and antioxidants and their use in the rubber industry many workers began to suffer ill effects from exposure to these complex chemicals. Among the early offenders, aniline and some of its derivatives; "hexa" (hexamethylene tetramine); the toluidines; and paraphenylenediamine caused so many cases of poisoning and dermatitis that there was a rush to develop harmless or less harmful substitutes. Some of these substitutes have been used with no reports of harmful effects, but most of the available information has come from direct questioning of rubber fabricators, not from toxicological experiments. Almost without exception this group of materials is identified by chemical names which are extremely unwieldy and the tendency in this industry is to use trade names "D.P.G.," "Tuads," etc. This makes it all the more important that Dr. Healy's work in classifying these materials according to potential harm,[1, 2] be continued and brought up to date. Also an organized start should be made in studying the effects of these compounds in controlled experiments and within the industries themselves.

The compounds most frequently mentioned in working formulas for synthetic rubber are:

Diphenylguanidine	(D.P.G.)
Benzothiazyl Disulfide	(Altax)
Mercaptobenzothiazole	(Captax)
Tetramethylthiuram Disulfide	(Tuads)
Hexamethyleneammonium Dithiocarbamate	(Latac)
Dinitrophenyl Dimethyldithiocarbamate	(Safex)
Dihydroquinoline derivatives	(Flectols, Agerite Syrup)
Phenyl α-Naphthylamine, Phenyl β-Naphthylamine, — and mixtures with m-toluenediamine	(Neozone, Neozone A, Neozone B, Neozone C, Neozone D)

Because of toxic and irritating effects some of these accelerators have been prohibited on government contracts by the Chemical Warfare Service. Impurities account for the danger in using some of the complex compounds; for example, aniline has been found as an impurity in several of the Neozones. Safe practice would dictate avoidance of exposure either by inhalation or skin contact, not only because of immediate effects but because prolonged exposure may result in serious injury. Absorption through the skin may be minimized by the use of protective creams—the so-called "Chemical Gloves"—and by frequent and thorough cleansing of the exposed parts of the body.

Inorganic Accelerators

Although no dust should be promiscuously disseminated into the atmosphere, the toxic dusts are the ones to be especially avoided. The inorganic accelerators most frequently recommended are the oxides of zinc and magnesium; these may create a nuisance

but have not been shown to have any definite harmful effect. However, lead oxide, mercuric oxide, and selenium compounds have been recommended and used for special properties, and the dusts of these compounds must be removed by local exhaust ventilation both in weighing out batches and in incorporating them on the mill. Lead has also found use, both as the oxide and in the form of a soap during polymerization by emulsification. Of course, both uses call for extreme caution in handling. The history of poisoning by both lead and mercury is so well known that there is no excuse for careless use of their compounds in modern industry.

Plasticizers

THE working formulas for compounding of most synthetic rubbers call for relatively high proportions of plasticizers. With some of the plasticizers there is little danger during incorporation into the mix, but a real hazard is presented when they are volatilized during vulcanization. Dibenzyl ether, dibutyl phthalate and tributyl phosphate have been reported to cause irritation of the upper respiratory passages and nose-bleeds.

Chlorinated naphthalenes have been recommended as plasticizers in special applications. The long history of severe dermatitis, poisoning, and death from the use of these compounds in industry should impress upon those planning to use them the necessity for removal of the vapor at the source by local exhaust ventilation and skin protection plus supervised washing to eliminate the skin hazard. Washable uniforms should be provided and laundered frequently. Separate lockers for work clothes and street clothes of all workers handling the chlorinated waxes are necessary.

Solvents

THESE represent one of the greatest hazards in the use of synthetic rubber. Solvents are used in great quantities and they generally are of the most toxic varieties. The operations in which the hazard is greatest are preparation and use of cements, preparation and use of extrusion mixtures, preparation and application of fabric coating mixtures and subsequent drying of the fabrics by heat.[23] Some of the specific applications in which these harmful exposures are most common are: manufacture of raincoats and similar impervious clothing, manufacture of airplane fuel tanks and balloons,[23] manufacture of gaskets and packings.

The resistance of these rubber substitutes to ordinary solvents has required the use of such highly toxic materials as the aromatic hydrocarbons—benzene, toluene and higher homologues; the chlorinated hydrocarbons—carbon tetrachloride, ethylene dichloride, monochlorbenzene, etc.; methyl ethyl ketone, butyl alcohol.

Benzene has been responsible for so many poisonings in industry that it has elicited such extreme opinions as: "The safe concentration of benzol in the workroom air is zero." Several years ago a safe level of 75 parts per million was proposed. Why the American Standards Association upped this to 100 parts per million a few years later we cannot understand. We believe that a solvent which is so dangerous to the blood should, in fact, be controlled by the best engineering methods to approach as closely as possible the ideal concentration of zero in the workroom air. Closely related to benzene and proposed by some as a safe substitute is toluene. The suggested safe limit varies from 100 to 200 parts per million. Recent work has shown that an eight hour exposure to 200 parts per million dulls the senses to the extent that the worker becomes more accident prone.[27] The severe poisonings and deaths which have resulted from the use of toluene as a substitute for benzene, with no control of the vapors, illustrates the fallacy of not instituting control measures until specific physical harm has been suffered by the workers exposed. In searching for a safer substitute it should be borne in mind that physical properties, such as boiling point, do not necessarily give a true measure of the vapor concentrations. The temperature at which the solvent is used must always be considered. Toluene is now allocated to special war purposes and benzene is once more in common use in the rubber industry. We trust that adequate precautions will be taken and that the vigilance will not be relaxed when toluene again returns to this industry.

The chlorinated solvents have a long history as industrial poisons. Studies in recent years[30] have indicated the safe limit for carbon tetrachloride vapors should be reduced from the value of 100 parts per million probably to the range of 25 to 50 parts per million. The suggested safe limit for monochlorbenzene is 75 parts per million.

For butanol and methyl ethyl ketone, which are used primarily with the vinyl polymers, the suggested safe level is 100 parts per million.

Bunas and the butyl rubbers are the only common synthetic rubbers which are appreciably soluble in aliphatic hydrocarbons. If the petroleum derivatives used for dissolving these rubbers contain aromatics, as many have been found to do, the suggested safe limit of 1,000 parts per million (for gasoline) must be scaled downward. Before using solvents, or for that matter accelerators, antioxidants, etc., which are identified only by trade names, the rubber manufacturer will be using proper caution only if he learns what they really contain. If he has the facilities, he can have them analyzed in his own laboratories. Often it is simpler to communicate with the manufacturer of the solvent or other material. Or, governmental agencies may assist the user in appraising the danger from some of the trade-named materials.

Because so many instances have been observed of a window exhaust fan or wall fan being used to remove solvent vapors, and even dusts, we want to emphasize here that as a rule such installations are not only ineffective but may actually increase the hazard by moving the contaminant towards the worker. Most important in the control of solvent vapors is removal of the vapors as close to the point of generation as possible, and in such a way as to carry the exhausted air away from the worker. Nor is the current rage for down-draft exhaust entirely justified. Although the concentrated vapors of most solvents are heavier than air and would flow downward in a draft-free area, it is obvious that a down-draft exhaust beneath the table cannot possibly remove solvent vapors from the top of a broad table without first carrying them into the breathing zone of the workers along the edge of the table. Lateral exhaust is effective at many spreading and cementing operations. Ventilation near the floor may be used to reduce the fire hazard but it is not necessarily effective in protecting the workers from inhalation of the vapors. This should be immediately obvious from the fact that toxic concentrations are measured in parts per million while explosive concentrations are measured in percentages. The numerous cases of illness and death reported among workers at spreading tables indicates that more attention will have to be paid to the design of effective exhaust systems at these operations. Finally, it must be remembered that whenever it is impossible or impracticable to protect the worker from harmful concentrations of solvent vapor by local exhaust ventila-

tion, the reliable alternative is a supplied-air respirator properly used.

Vulcanization

THIS admittedly complex process can give rise to a number of toxic gases, such as hydrogen sulfide, carbon disulfide, mercaptans, etc. When Neoprene was introduced as a rubber substitute, there were frequent complaints of a "tear gas" generated during vulcanization. Most processors state that the newer types do not give off obnoxious gases. The Thiokols, however, still retain the reputation of being the smelliest members. These possibilities of poisonous and irritating gases during vulcanization[18] show the need for adequate control by exhaust ventilation.

Dusting

FOR a long time it was thought that free silica and asbestos are the only hazardous dusts from the standpoint of pneumoconiosis. In recent years it has been shown[28] that silicates such as talc and mica may cause a lung disease called "silicatosis." For this reason, and the fact that it makes a great difference in plant housekeeping, dusting should be done on tables provided with enclosures and exhaust ventilation. Our own observations have shown that uncontrolled dusting operations usually produce air concentrations far in excess of the proposed maximum limit of 15·000,000 particles per cubic foot of air.

Actual Experiences

THE following are direct quotations from letters answering our requests to those industries having experience in making and using synthetic rubber for their opinions of the hazards [31]:

(1) ". . . . due to the narcotic properties, exposure to butadiene vapor is likely to be a contributing factor in other accidents since the workman may experience a heavy feeling and a dulling of his senses.

". . . . that butadiene be handled in closed systems with immediate elimination of any leaks . . . . vapors must be removed at source.

"The obnoxious odor of styrene is likely to make dangerours concentrations intolerable to workmen."

(The same plant providing the above information makes the following statement.)

". . . . we have not suffered any lost time accidents . . . . workmen have shown no ill effects after five months of operation. We have had practically no trouble with dermatitis . . . . we provide work clothing, free laundry service, free soap, and encourage our workmen to bathe thoroughly at the conclusion of their work day.

". . . . the manufacture of synthetic rubber is hazardous but many of the hazards can be eliminated or modified by a good safety program . . . ."

(2) "Plasticizers for butadiene of low boiling points . . . . should be avoided. Many esters and ethers which fall in this group have given us trouble . . . . dibutyl ether resulted in marked irritation . . . . of nasal passages with frequent nose bleeding. Tributyl phosphate was very bad. During hot weather, workers handling Hycar which contains phenyl beta naphthylamine . . . . suffer from dermatoses of exposed parts of the body. Rashes below the elbow were frequent. Part of this may have been caused by dibutyl phthlate."

(3) ". . . . in Neoprene and Butyl rubber lead compounds are frequently used."

(4) "The accelerators, curatives, and compounding ingredients used in rubber are also commonly used in most of these synthetics . . . . use the same precautions that have always been considered advisable in handling those materials which may present a hazard . . . . tetramethylthiuram-disulfide (Tuads) may cause dermatitis . . . . solvents used in washing uncured sheets of compounded synthetic rubber are usually toxic . . . . coal tar derivatives are the worst offenders (benzol, toluol) . . . . chlorinated solvents are also toxic . . . . Proper ventilation seems to remove all health hazards connected with solvents."

Summary

THE data presented in this paper can best be summarized by a review of the most hazardous operations and the proper means for their control.

Synthesis and Polymerization—Highly volatile liquids and gases, most of them quite toxic and highly flammable, are pumped from reservoirs into reaction vessels. Control measures include ventilation wherever gases or vapors may escape, prevention of skin contact, and a strict set of safety regulations, as outlined above, for all operations requiring a worker to enter tanks or reaction vessels.

Fabrication—Avoid use of the known bad actors among accelerators, antioxidants, etc., if possible. In any case, wherever potentially toxic materials are handled, the resulting air-borne dusts and vapors should be removed at the source by exhaust ventilation. The processes which may be the source of these contaminants are: weighing, mixing on mill or Banbury, extrusion, vulcanization, dusting, spreading, and cementing.

The greatest enemy of industrial health, as well as industrial safety, is ignorance. If we acquaint ourselves with the actual and potential hazards in our plants, install the proper control measures, and educate our workers to the potential harm in the materials to be handled and how to use the protective devices provided, we will get better production and less labor turnover.

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Comments on "Radium Painting" by Morse and Kronenberg

—in Industrial Medicine, December, 1943—

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THE excellent paper on "Radium Painting—Hazards and Precautions" by MORSE and KRONENBERG in INDUSTRIAL MEDICINE, December, 1943, provides an interesting picture of the present status of the hazard in the painting of luminous dials, and an admirable supplement to the one by EVANS (*J. Indust. Hyg. & Tox.*, September, 1943, p. 253).

A rather important question arises on consideration of the results of breath radon tests which reflect the amounts of radium that are contained in the bodies of many dial painters. The question is, how do these workers receive radium in their bodies? The answer to the question is important because it will indicate which are the important preventive measures. As anyone will realize who has had occasion to study operations in dial painting establishments, the answer is not at all obvious, for as EVANS has indicated, excessive radium intake is found among workers in shops where the highest standards of housekeeping and cleanlinesss are adhered to.

MORSE and KRONENBERG emphasize the importance of personal cleanliness, especially of the hands, to avoid ingestion of radium-containing paint with the food or otherwise. This is the view generally taken by all concerned with this problem (see also papers by FLINN (INDUSTRIAL MEDICINE, October, 1941, p. 57) and MORRIS *et al.* (*J. Indust. Hyg. & Tox.*, September, 1943, p. 270). We certainly do not claim that cleanliness is not of importance, but we do believe that reason indicates that inhalation of dust is far and away the most important avenue of entry to the body.

It has been generally recognized for decades, in considering such hazards as lead dust, that inhalation of toxic dusts is responsible for occupational poisoning to an overwhelming degree as contrasted to poisoning from ingestion of dust. It is pertinent to recall once again that a worker inhales 25-30 pounds of air during a working day, compared to a food and liquid intake of 3-4 pounds in the same period.

Just as it was common years ago to lay almost all emphasis on those practices that would minimize the ingestion of lead dust by the alimentary tract, so today we are emphasizing the same aspect in the dial painting occupation. We suggest that this obscures the inhalation hazard which we believe of much greater importance.

Consider the fact that an intake (and retention) of 2 milligrams of radium paint represents the maximum safe body content, not daily, but for all time.

Two milligrams of radium paint powder would occupy a volume roughly the size of a common pin head. If dispersed in air in such concentrations that it would all be inhaled over a period of a few days, it would obviously be considered an extremely small amount, and anyone familiar with small concentrations of lead dust and the nature of industrial operations that can cause them will have little difficulty in conceiving of an occasional, localized atmospheric dust hazard even in a high grade dial painting shop.

On the other hand it is difficult to conceive of a pin head volume of dust being ingested with food, *after* washing the hands with soap and water, by a substantial number of workers, even though, as MORSE and KRONENBERG report, "the best previously practiced personal hygiene will not remove this paint." Our view is that, if thorough ordinary washing does not remove such paint from the skin, it seems unlikely that it could be ingested by transferral to food in significant amounts.

Furthermore we consider the authors' observation that relatively large amounts of paint dust were found in ventilating ducts and fans tends further to support the view that atmospheric dust in significant amounts occurs frequently in this work and is, therefore, the most important hazard.

This observation, incidentally, provides the most important answer to the question raised by the authors as to whether or not we "have accepted too readily the glass top booth." The more important function of local exhaust is in *dust* control rather than radon control (see paper by HEMEON and EVANS, *J. Indust. Hyg. & Tox.*, May, 1942), and the observation as to accumulation of dust in exhaust ducts is, to our mind, the most convincing evidence of the desirability of local exhaust. As for the particular form of local exhaust, there is no good reason why the slot exhaust at the rear of the work bench described by the authors would not serve as well as a glass top booth. However, as it requires exhausting a greater air volume than the booth, there are some circumstances where it would not be indicated.

On another point we differ with the authors, namely, the importance of the tolerance value for radon, 10^{-11} versus 10^{-10} curies per liter of air. It is stated that "controversial opinions . . . . in the order of 10 to 1 mean considerable regarding the physical requirements for control measures," and that there is justification for re-examination of these values. It is, of course, understood that we are writing from the engineering viewpoint, and from that angle we point out the following: The highest values that have been published showing the concentrations of radon in workrooms are of such magnitude that (1) they never approach the higher safe limit that has been proposed, i.e., 10^{-10} curies/liter; and so, according to that standard, there is never any hazard from radon; and (2) the highest values reported are only twice the lower proposed safe limit—i.e., even using the more conservative limit of 10^{-11}, the radon hazard is mild even under conditions of poor ventilation, and an exhaust system for minimizing the dust hazard would bring

the values down to a fraction of the conservative limit. In other words, it is easy to be safe and it does not penalize the industry. Therefore we suggest that the re-examination proposed would be of only academic concern—certainly not of engineering interest.

Arsine, Stibine, and Hydrogen Sulfide

—Accidental Generation in a Metal Refinery—

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ARSINE (hydrogen arsenide) is a colorless, inflammable, non-irritating gas with a specific gravity of about two and one half times atmospheric air and a very faint garlic-like odor. It is formed whenever nascent hydrogen is produced in the presence of a soluble compound of arsenic. Such formation is not uncommon when an acid reacts with a metal either or both of which contain traces of arsenic. Poisoning has occurred in a number of industries in which hydrogen is produced and/or used, unless the hydrogen is produced electrically (arsenic free).[1] Examples of such industries are:

1. Filling of small or large balloons.
2. Welding and cutting with blow torches.
3. Metallurgy.
4. Soldering.
5. Etching with zinc, and
6. In chemical laboratories.

It is also liberated from metallic arsenides, such as calcium arsenide, by the action of water.

Stibine (antimony hydride) is an odorless gas about four and one half times as heavy as air[2] formed by reactions identical to those for the formation of arsine. It has been found to be generated by storage batteries on overcharge,[2] and will be formed whenever nascent hydrogen comes in contact with metallic antimony or with a soluble antimony compound.

The toxicity of arsine has been recognized for many years. Henderson and Haggard,[3] in "Noxious Gases," discuss the physiological effects in considerable detail. They summarize the response as follows[2]: \

	Arsine P.P.M.
Slight symptoms after several hours exposure.....	30
Dangerous for exposure of one hour.....	50
Fatal to man in exposure of 30 minutes.....	250

The literature, however, gives us little information about the effects of stibine on man. Stock and Guttman[2,4] concluded that the toxicity of stibine is similar to that of arsine. This has been confirmed by Haring and Compton.[2]

Hydrogen sulfide is also a colorless gas, heavier than air, with a very objectionable odor and an irritating effect on the mucous membrane of the eyes, nose and throat, the respiratory tract in general and also on the cornea of the eye. It is met frequently in the petroleum industry, in mines, in the coal and gas industry, and in the handling of slags. It may be formed in a manner identical to that of the formation of arsine and stibine, namely, the action of nascent hydrogen on metallic sulfur.

Generally speaking, the toxic effects of hydrogen sulfide are well known and, since the presence of the gas is easily and quickly detected by its odor, preventive and control measures are usually provided.

Arsine and stibine, however, being essentially odorless and rarely encountered, and occurring in operations where they are often not expected, may accidentally lead to poisoning. Such a condition arose recently in a metal refinery as a result of a change in a process of purification and an unauthorized activity—resulting in the poisoning of three employees by arsine, stibine and hydrogen sulfide. The exposure was of a relatively short duration, and each of the three men recovered.

As a result of the war it has been necessary for this refinery to accept ores from various sources and with varying compositions. Recently the ore has contained relatively high percentages of impurities of arsenic, antimony, copper, etc. To reduce these objectionable impurities to permissible limits a process was developed using metallic aluminum. This metal is added as sticks or sheets to the molten metal (1200° F) in excess while the mass is being stirred in a rotary manner; and is dropped in the center of the vortex. It is thought that the aluminum combines with the arsenic, antimony, copper and excess sulfur added in the course of refining, etc., and that these combinations appear in the dross which is brought to the surface most effectively by bubbling air through the molten mass. Such procedure naturally leads to the formation of a relatively large quantity of oxide of the metal desired to be purified. This oxide also constitutes a major portion of the dross. After the dross has been brought to the surface it is skimmed off while still hot, by means of a large metal skimmer operated by overhead crane. It is dumped into a large metal bucket in which it was intended to be cooled through natural processes. Several employees, however, conceived the idea of adding water to cool the dross more rapidly and also to settle the oxide dust. They provided themselves with a garden hose attached to an ordinary faucet and as soon as the bucket containing the hot dross was delivered to them they "poured on the water."

This addition of water to the hot dross was begun at 8:00 A.M. By 9:00 A.M. of the same day a white man, working on the platform adjacent to the operation of adding the water, became ill complaining of weakness, headache, and abdominal and lumbar pain. He left the job at 9:00 A.M.

The colored boys who added the water state that as the water hit the hot dross a yellow and often blue flame "leaped up" and that there was a tremendous evolution of gas with a musty odor and irritating effect on eyes, nose and throat. One of these colored boys noticed his urine to be "bloody" at noon of the same day; and by 3:00 P.M. he felt so weak and nauseated and had such severe abdominal and back pains, as well as headache, that he "checked out." The other boy also felt sick with identical symptoms, but he stayed on the job until 5:00 P.M. The next morning they both reported to first aid and were sent to the plant physician.

All of the operations described are carried out in a very large building with exceedingly high ceilings. Natural ventilation alone is available.

Laboratory Studies

SAMPLES of the dross were obtained; 300 grams is put into a round-bottom flask provided with a dropping funnel and a thermometer and connected to three fritted glass bubblers each containing 200 cc. of 10% lead acetate and finally to two bubblers each containing 100 cc. of 5% silver nitrate solution. The dross is heated to 95°C and a few cc. of water are dropped into the mass. The entire system is connected to a suction pump and air is drawn through the system at a uniform rate. Within a few seconds after the addition of the water, the silver nitrate becomes almost black while the lead acetate solution changes only slightly in color. The temperature is raised to 110°C, and another 10 cc. of water is added. At this point the lead acetate solution

rapidly becomes black and the silver nitrate solution color changes become more marked.

The black precipitate ($SbAg_3$) is filtered off. Dilute HCl is added to the precipitate and the mixture filtered. Water is added to the filtrate and a small quantity of AgCl is filtered off. The addition of H_2S to the filtrate causes the formation of the orange-red Sb_2S_3. The precipitate insoluble in dilute HCl is dissolved in aqua regia and found to be reduced silver. The solution of silver nitrate from which the $SbAg_3$ has been removed (arsenous acid) is treated with a solution of NaCl, the AgCl filtered off and the filtrate treated with H_2S. The canary-yellow As_2S_3 is formed.

Conclusions

THE addition of water to the hot dross containing metallic aluminum causes the formation of nascent hydrogen which reacts with the arsenic, antimony and sulfur to form SbH_3, AsH_3, H_2S.

2. These gases are produced in sufficient quantity to be observed to be toxic to three employees exposed in the building.

3. The reaction requires an elevated temperature for the production of amounts of these gases adequate to be detected by the use of lead acetate and silver nitrate solutions.

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Long Island College of Medicine, November 1-12, 1943.

American Industrial Hygiene Association
News of Local Sections

Chicago Section

EFFECTS of dust on health and a specific control measure were the subjects of the January 27, 1944, meeting of the Chicago Section. DR. L. E. HAMLIN, Medical Director, American Brake Shoe Company, Chicago gave a comprehensive review of "Silicosis for the Industrial Hygienist." His discussion included the fundamentals of the condition, and was of interest not only to those who were not too completely familiar with the subject but also to those of the group who had long been familiar with silicosis, in view of the clarity of detail which DR. HAMLIN included. Of especial interest were the slides showing a photograph of a worker exposed to dust and then the appearance of his chest x-ray. These illustrated the essentialness of x-rays in any medical control program where there is exposure to silica dust.

MR. C. A. SNYDER, Supervising Engineer, American Foundry Equipment Company, Mishawaka, Indiana, gave the engineering details of "Exhaust booths for dust control in grinding operations." Slides showing actual installations were used to illustrate MR. SNYDER'S talk. Members of the Chicago Section were interested to learn that successful results have been obtained from this method.

The February 24, 1944, meeting was presented by the Industrial Hygiene Division of the Illinois State Department of Labor, under the direction of JAMES E. CROSSER, JR. An extensive investigation of health hazards in soldering operations occurring in a large number of plants has been in progress by the Division. Much material was presented concerning the extent of exposures to lead which were found to be excessive in operations where poor housekeeping was observed, and especially where there was poor housekeeping with no exhaust ventilation. Operations provided with proper exhaust ventilation together with good housekeeping were found to present no excessive lead hazard. Some results of this investigation have been published by the Illinois State Department of Labor, and reprints of these may be obtained on addressing MR. JAMES E. CROSSER, JR., Chief Chemist.

"Recent Exposures and Special Problems in Occupational Disease" was the subject presented by MR. A. M. NOYES, Industrial Hygiene Engineer. A number of such examples were indicative of the type of exposure that should be looked for.

Metropolitan New York Section

DR. A. G. CRANCH, Industrial Toxicology Department, Union Carbon & Carbide Corporation, discussed the subject "Hand Cleaners" at the December 16, 1942, meeting. His talk included consideration of choice of hand cleaner depending upon the material with which the hands are in contact, desirable and undesirable types of cleaners, and the relation between hand cleaners and dermatitis. The following officers were elected, DR. A. G. CRANCH, Chairman; W. R. BRADLEY, Vice-Chairman; M. B. JACOBS, Secretary-Treasurer; and LT. J. SIEGEL, USNR, Councilor.

"Recent Developments Concerning Hazards of Magnesium" were discussed by MR. C. B. FORD, Division of Industrial Hygiene, New York State Department of Labor, at the January 14, 1944, meeting. MR. FORD cautioned that the conventional, dry-type of dust collector must never be used for the collection of this inflammable dust, as such systems have accident records which prove them to be extremely hazardous. Grinding wheel sparks fanned into flame inside the collector pipes are probably the cause of ignition. Two instances were described where explosions occurred in these systems, which caused the death of a number of workmen. The only systems considered safe for the exhaust and collection of Mg. dust are those employing the wet-quenching principle in which the dust is precipitated by either a heavy spray of water or mineral oil. Other safe practices discussed concerned adequate protective clothing for workmen who come in contact with magnesium dust, disposition of waste dusts and sludges and the approved methods of extinguishing magnesium fires. A Factory Insurance Association dust explosion chamber which is used for determining the explosibility of a dust was displayed.

The following committees were appointed: Membership, MR. BRADLEY, MR. PATTY; Public Relations, MR. PATTY, MR. SIEGEL and MR. SEAGRAVE; Program, MR. BRADLEY, MR. BONSIB, MR. GUMAER and MR. JACOBS.

"Protection of Workers against Industrial X-Ray Exposure" was discussed by MR. S. A. BARNETT, Ray Proof Corporation, New York at the February 17, 1944, meeting.

Michigan Section

THE Michigan Industrial Hygiene Society has been holding a number of meetings in cities throughout the state. A meeting held in Kalamazoo on January 19, 1944, was addressed by MR. WARREN A. COOK, Director, Division of Industrial Hygiene and Engineering Research, Zurich General Accident & Liability Insurance Company, Chicago, on the subject "Evaluation and control of industrial health hazards." MR. COOK emphasized the desirability of proper evaluation of health hazards as an effective approach to their proper control.

On February 9, 1944, MAJOR ALLEN D. BRANDT, Safety and Security Branch Office of the Chief of Ordnance, Chicago, discussed "Industrial Ventilation," at the meeting held in Detroit. MAJOR BRANDT showed why some exhaust systems may fail to operate satisfactorily, and what methods should be adopted for making industrial ventilation effective.

At Grand Rapids on February 29, 1944, DR. C. O. SAPPINGTON, Industrial Health Consultant, Chicago, presented the subject "The Meaning of Industrial Medicine, Hygiene and Health." This meeting was held jointly with the Greater Grand Rapids Safety Council. In outlining the meaning of these three phases of industrial health, DR. SAPPINGTON pointed out the necessity for cooperation of safety engineer, nurse, industrial hygiene engineer, physician, labor and management.

MEDICINE SURGERY

INDUSTRIAL HEALTH
OCCUPATIONAL DISEASES
TRAUMATIC, INDUSTRIAL

INDUSTRIAL HYGIENE
INDUSTRIAL MEDICINE
& RAILROAD SURGERY

Industrial Medicine | Volume 13 | MAY, 1944 | Number 5 | Industrial Medicine

This Month

INDUSTRIAL Hygiene.....*Irving R. Tabershaw, M.D.* 363
—Its Correlation to Industrial Medicine
OBSERVATIONS on Skin Diseases.....*George E. Morris, M.D.* 365
—Industrial and Otherwise
1009 CONSECUTIVE Accident Cases.....*Captain James Mann* 368
—Analysis, at One Ordnance Plant
TREATMENT of Sprained Ankle.....*Otto Meyer, M.D.* 374
—With Combination Pressure Bandages
INDUSTRIAL Health Forum..... 375
—Questions and Answers
PRACTICAL Management of Arthritis.....*Daniel H. Levinthal, M.D.* 377
—Medical and Orthopedic
(With *Catherine E. Logan, M.D., Kate H. Kohn, M.D.,* and *William I. Fishbein, M.D.*)
NEW HORIZONS in Industry.....*L. Holland Whitney, M.D.* 386
—The Field of Industrial Vision
(With *J. H. Coleman, Ph.D.,* and *Richard Feinberg*)
THE TOPOGRAPHY of Pins.....*H. D. Junkin, M.D.* 387
—Techniques of External Fixation of Fractures
NEW ENGLAND Conference of Industrial Physicians..... 395
—Synopsis of Meeting
CIVILIAN Health in Wartime.....*Warren F. Draper, M.D.* 396
—Summary of a Good Record
HEALTHY Morale, the Heart of Industry.....*J. H. Hess, M.D.* 399
—"Good Wages, Good Treatment, Good Health"
NUTRITION in Industry.....*Florence G. Dorward* 403
—A Main Pillar of Industrial Health
EDITORIAL: Lay Politics in a Medical Field..... 406
"If You Can Keep Your Head"..... 408
WORKERS' Participation .....*J. J. Bloomfield* 412
—In a Health-Safety Program
INDUSTRIAL Hygiene 420
—Highlights in State Health Department Activities
INDUSTRIAL HEALTH and DISEASE:
Industrial Medicine: Its True Importance..... 440
Industrial Toxicology vs. Industrial Psychiatry..... 442
Health Problems in Oregon..... 444
BOOK REVIEWS 446
INDUSTRIAL Nursing .....*Pearl H. Walden, R.N.* 451
—As a Career
THE NEW Woman Worker.....*Anna L. Kennedy, R.N.* 452
—Introducing Her to the Job
RECORDS.....*Mrs. Margaret D. Andresen, R.N.* 453
—Their Proper Use
COMMUNITY Resources.....*Esther L. Davey, R.N.* 454
—Enlisting Their Cooperation
A PHYSICIAN-NURSE Board.....*Eileen McCarthy, R.N.* 456
—For Mutual Aid in the Solution of Common Problems
INDUSTRIAL Nursing Counselor Service..... 457
PERSONAL Hygiene 457

Comment and Opinion..22 Ten Years Ago..... 62
Current Articles .....42 Dr. Pilgrim 410

I THINK we can all agree, since the physician is the health officer of the plant and responsible for the maintenance of employee health generally, that the functions of industrial hygiene should be directly under his control." This is from DR. TABERSHAW'S clear and sensible analysis of the correlation of industrial hygiene to industrial medicine (page 363). We *can* agree, all of us—inasmuch as the matter upon which our minds are meeting admits of no controversy on the merits. What DR. TABERSHAW says is true, not only on the plant level but equally on the government level. On that level the U.S.P.H.S. and the state *health* departments are the agencies whose control "the functions of industrial hygiene," in so far as they are governmental, "should be directly under." Thus the editorial on page 406. We hope our attitude on the matter of industrial hygiene functions being put anywhere else will be as clear and definite as was that of Calvin Coolidge's minister on the subject of his sermon. Returning from a Sunday service, Cal was asked what the sermon was about. "Sin," he replied. "What did the minister say about it?" was the next question. To which Cal answered, "He was ag'in it!" . . . . DR. MORRIS' "Observations on Skin Diseases" (page 365) will, indeed, "probably surprise you" in several respects. It would mar the interest to anticipate by comment here. . . . CAPTAIN MANN'S "Analysis of 1009 Consecutive Accident Cases at One Ordnance Plant" (page 368) is a masterpiece of original research, and a fine example of the kind of statistical compilation and study that are reaching out toward the goal of whatever *maximum* control of accidents is within the power of medicine and management. That is a far horizon. If and when, by the cumulative effect of many more such studies as the one CAPTAIN MANN presents, that horizon is approached the only industrial accidents occurring will be the ones that nothing of persuasion, laws, rules, or anything else out-

—Continued on page 6.

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Absenteeism, instances 34
Accident: analysis method 369
frequency, variations during shifts 370
incidence, factors 373
proneness, real factor 372
report, monthly and illness 454
Activities of state industrial hygiene depts. 420
Adult health: public health emphasis 418
services, and industrial hygiene 397
Air sanitation 24
Alabama, industrial hygiene, 1943 420
Alkalis, and skin rashes 366
Aluminum, splinter injury 375
Ankle, sprained, treatment 374
Arc flash, no sterilizing effect 444
Arkansas, industrial hygiene, 1943 420
Arsenic, prevention methods in re 62
Arthritis: classification of types 378
clinic results 384
gouty, photo and x-ray 379
treatment, clinic 377
"BO" and nurse management 457
pointers and recommendations 453
Back, lower, pain, arthritic 380
Back support, treatment of arthritis 381
"Blue Monday" accidents 374
Booth, Dr. Courtland L., Oregon report ... 444
Brandwein, Dr. Julius, sudden death 10
Brasses, metal fume fever 364
British Columbia, industrial hygiene, 1943. 438
Burns, caustic soda 18
Cadmium, toxicity, episode 442
Cafeteria: service, importance 404
survey, Baltimore 38
Canadian Industries Limited 26
Carbon monoxide, hysteria episode 442
Carbon tetrachloride, medical uses 50
Cardiovascular survey, supervisors 52
Caustic soda burns 18
Central States Society, meeting 16
Cervical arthritis, treatment 382
Cervical traction, arthritis treatment 381
Chrome plating hazards, effects 376
Cleansing agents, skin eruptions 366
Clinical findings, relation to visual skills ... 386
Community resources, available to nurses .. 454
Connecticut, industrial hygiene, 1943 420
Cook County Hospital Arthritis Clinic 385
Corset, treatment of arthritis 381
Death, leading causes 397
Dental program, Jahco 402
Dentists, industrial, meetings, 1944 12
Dermatitis: among welders 16
and personal cleanliness 376
chlorinated naphthalenes and diphenyls. 364
in plastics manufacture 364
predisposition to 376
shipyards 442
Diabetes and trauma 54
Disease control, progress in 397
Duties, of industrial nurse 451
Education: in safety necessary 408
nutrition program 404
Educational programs in industrial plants. 404
Examinations: Jahco medical center 400
physical, union prohibition 444
pre-placement 444
survey, of eyes 62
Eye: disorders 444
hygiene program, industrial 24
program, value in production 386
Eyes, nursing care of 60
ophthalmologists, and obscure problems .. 60
Executives, long hours, Jahco 399
Fatigue, "four o'clock" 62
Federal medical care, opinions 22
Feet, arthritic, treatment 379
flat, arch support 379
shoes and comfort 402
Femur, fractures, precision pinning 392
"Four o'clock pick-up" 62
Fractures, fixation, precision pinning 387
Future of industrial nursing 452
General practitioner, industrial education .. 440
General news 12
Getting a job as industrial nurse 452
Gynecologic: aspects, certain occupations .. 446
examinations, in heavy work occupations 446
Hands, arthritic, treatment 382
Health: and safety, ABC's of teamwork ... 416
civilian, in wartime 396
employee plan, Waltham 42
hazards, in welding 444
insurance, union 24
state of, in nation 40
Hips, arthritic, treatment 380
Home contacts, industrial nurse 455
Hours, long, no hardship 399
Hours per week, average, Jahco 399
Humerus, fractures, precision pinning 388
Hygiene: Division, Massachusetts 365
personal, problem 457
Illinois, industrial hygiene, 1943 424
Indiana, second health conference 36
Introduction to job, new woman worker ... 452
Industrial: dentists, association meetings. 12
eye hygiene program 24
health, committee report, Oregon 444
health program essentials 414
health, related problems 414
Industrial hygiene, state activities, 1943:

Alabama	420	Ohio	430
Arkansas	420	Oklahoma	432
Connecticut	420	Oregon	432
Illinois	424	Pennsylvania	432
Kansas	424	Rhode Island	432
Louisiana	426	Tennessee	434
Maryland	426	Texas	434
Michigan	428	Utah	436
Minnesota	428	Vermont	436
New Hampshire	428	Washington	436
North Carolina	430	West Virginia	438
British Columbia			438

Industrial hygiene: and public health 397
health, not labor, matter 406
Foundation, advisory board, personnel .. 8
functions belong under medical 363
service, elements and essentials 414
Industrial humanics 396
Industrial medicine, Army program 50
Industrial nursing, need for 451
Industrial physician: as health officer 368
functions 440
Injuries, types encountered 374
Jack & Heintz, Inc., medical program 399
Kansas, industrial hygiene, 1943 424
Keratoconjunctivitis, not occupational 444
Kirschner wire 393
Knees, arthritic, treatment 382
Labor, opportunity in industrial health 412
Lacquer spray "poisoning" incident 368
Lead, in substitute uses 364
Louisiana, industrial hygiene, 1943 426
Lower extremities, fractures 392
Malaria, health problem 397
Management, orthopedic, of arthritis 383
Maryland, industrial hygiene, 1943 426
Maryland, public health studies of illness .. 398
Mass hysteria, episode 442
Medical care: opinions on Federal 22
plans 14
Medical department, plant inspection 401
Medical program, Jack & Heintz, Inc. 399
Medical Seminar, American Mutual 30
Medical services, labor interest in 416
Metals: cleaning and casting hazards 364
toxic possibilities 442
treatment hazards 364
Metatarsal bar 379
Michigan, industrial hygiene, 1943 428
Miners' diseases, book review 446
Minnesota, industrial hygiene, 1943 428
Need for industrial nursing 451
Neoprene, Department of Labor report ... 18
New Hampshire, industrial hygiene, 1943 .. 428
New York Medical College, grant 12
Non-occupational: diseases, prevention ... 32
skin conditions 367
North Carolina, industrial hygiene, 1943 .. 430
Nurse: and personal hygiene problems 457
approved medical supervision 456
counselor service, qualifications 457
industrial, small plant 456
salary ranges, Mississippi 452
selecting the industrial 44
special, for Jahco associates 460
visiting, services advised 376
Nurses: in industry, qualifications, duties .. 451
public health, Clinton, organized 454
Nurseries, children's 446
Nursing: industrial, education 40
no national license 22
service, Jack & Heintz, Inc. 402
Nutrition; counsel available 404
Service Bureau, Springfield, Mass. 403
special training facilities available 451
Occupational diseases: diagnosis 442
reportable 28
test case, Minnesota 16
Old age, diseases associated with 398
Ordnance department, accident analysis .. 368
Oregon, health problems in 444
industrial hygiene, 1943 432
Oklahoma, industrial hygiene, 1943 432
Ohio, industrial hygiene, 1943 430
Orthopedic heel 379
Orthopedic management of arthritis 379
Pay schedules, industrial nurses 452
Pelvic traction, treatment of arthritis 381
Pennsylvania industrial hygiene, 1943 432
Personal: hygiene, pointers 453
hygiene, nurse management 457
news 8
Phenol, and skin rashes 366
Physician: functions in rehabilitation 46
industrial, range of capacities 440
Physical capabilities, clinical data 46
Physiotherapy, Jack & Heintz, Inc. 401
Pins, precision placement, fracture fixation 387
Plant inspections, medical department 401
Plastics, dermatitis hazard 364
Poisoning, rumor episode 368
Poisons, industrial 365
Politics, public health danger 408
Pre-placement examinations 444
Psychiatric problems, rehabilitation 396
Public health: developments 398
insufficient appropriations, forecast 22
need for definition 408
programs, industrial 397
proper department for industrial hygiene 406
Qualifications, industrial nurses 451
Quartz crystals, hazards in manufacture .. 38
Radius, fractures, precision pinning 391
Records, essential to industrial nurse 454
Rehabilitation: psychiatric problems 396
physician in 46
Rest room, proper use 453
Rhode Island, industrial hygiene, 1943 432
Safety program, visual aspects 387
Scabies, increasingly prevalent 367
Shoulder, x-ray study 396
Short-wave diathermy, Jahco 401
Silicosis, convention, Mexico 12
from wheat dust 54
test case, Minnesota 16
Small plants, medical plan aid 18
Smith-Peterson nail 393
Soaps, harsh, and dermatitis 366
Solders, lead content 364
Solvents: and thinners, rubber cement 375
toxicities 363
Skin disease; prevention in Indiana 36
therapy 367
State health departments, effectiveness ... 418
Steiner, Dr. Starling D., to Cadillac Motor 8
Steinmann pin 387, 393
Sterilizing effect, none in arc flash 444
Special nurses for associates, Jahco 403
Standing orders, absence of 456
Substandards, employment 444
Sulfonamide: drugs, developments 398
ointments, dermatoses 365
sensitization to 365
Synthetic materials, toxic possibilities 442
Syphilis, fellow employee exposure 376
Teaching: nurse, re personal hygiene 457
nutrition 404
Tennessee, industrial hygiene, 1943 434
Texas, industrial hygiene, 1943 434
Therapy: arthritis 381
in industrial skin diseases 367
at Jahco 401
"Three-dimensional seeing" 387
Tibia, fractures, precision pinning 393
Tolerance, electrically activated ergosterol 384
Toxicity, various solvents 363
Traction, therapy, arthritis 381
Trauma and diabetes 54
Tuberculosis manual, book review 448
Ulna, fractures, precision pinning 390
University of Western Ontario, grant 12
Utah, industrial hygiene, 1943 436
Venereal diseases, advances in control 399
Vermont, industrial hygiene, 1943 436
Vision program, value of 386
Visual defects, significance 56
Visual skills, relation to clinical findings .. 386
Vitamin D, effects of massive doses 384
Vitamins, statistics 18
Waltham employee health plan 42
Washington, industrial hygiene, 1943 436
Welders, dermatitis among 16
Welding: hazards 364
ventilation 375
West Virginia, industrial hygiene, 1943 438
Women: factors in superior performance. 372
hats, skin rashes 367
in steel employment 18
introducing to job 452
pre-employment examinations 36
psychological problems 444
stress and strain in heavy work 446
X-ray exposures, shoulder joint 396
X-ray radiation: hazards 376
treatment of arthritis 382
X-ray unit, Oregon Tuberculosis Assoc 446

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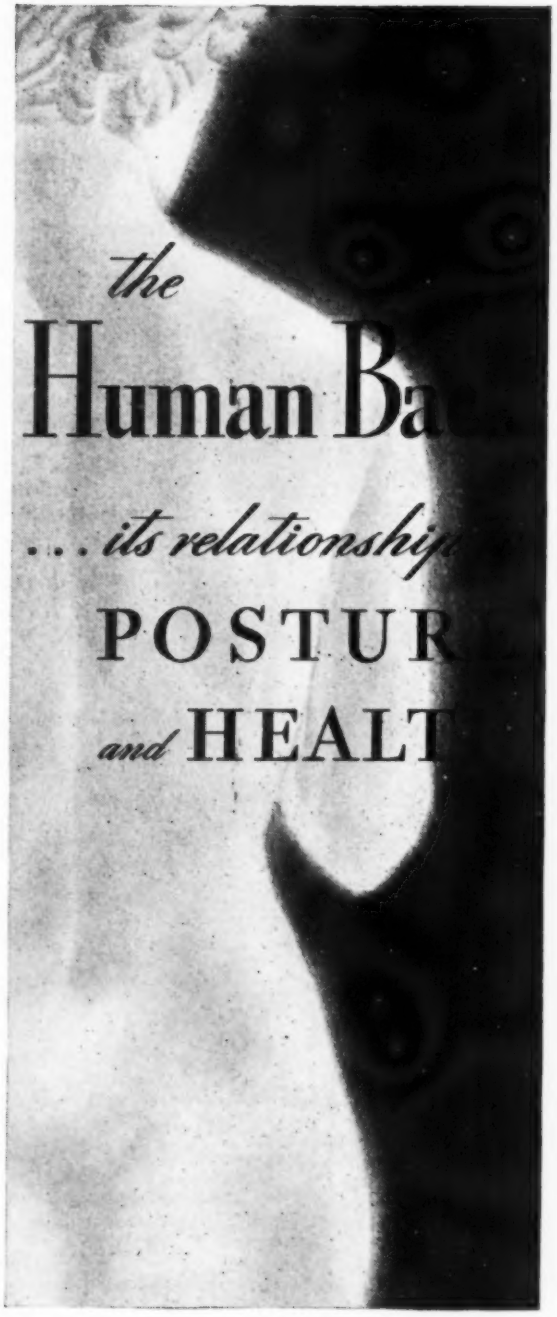
—*Continued from page 3.*

side of the individual employee himself, will prevent. What then? . . . . SPEAKING of far horizons, DR. WHITNEY, and associates at Sperry Gyroscope (page 374), describe some nearer ones in their preview of "a study soon to be published . . . . in the great field of industrial vision." This, their initial contribution, is stimulating. . . . DR. LEVINTHAL, and his co-workers in the Arthritis Division of the Orthopedic Clinic at Cook County Hospital, present the "Practical Management of Arthritis" (page 377). In the authors' words: "Since arthritis is notably a disabling disease, any therapy which serves to alleviate its symptoms becomes of interest to those who are entrusted with the health supervision of industrial workers." The article describes the methods by which "we were able to produce beneficial results in 93% of the cases which could be followed" . . . . DR. JUNKIN'S "Topography of Pins" (page 386) is the result of a very extensive study on the part not only of the author himself but also a number of midwest surgeons who have made themselves experts in the use of external fixation techniques. The illustrations were designed to aid the reader in visualizing the pin sites as if they were being modeled in actuality before him. This is an article to be read and studied. Complete familiarity with the principles it sets forth will relieve the preference for external fixation from a lot of complications. . . . DR. HESS (page 399) describes the medical program at Jack & Heintz. The JAHCO policy, he defines as "good wages, good treatment, and good health." The "good wages" and "good treatment," distinctive in their manifestations, have become nationally known. They have their reasons, and their rewards. The "good health" is presented here. It, too, has its reasons, and its rewards. The former are implicit in the medical program which DR. HESS directs; the latter are implied, rather than specifically set forth, in the "Long Hours, No Hardship" sub-title (page 399), and in the "solving of many of the production problems. . . ." as to which the record shows that JAHCO is one place where they are being solved. The "per week average from 77 to 84 hours for associates in the shop" and the "98 to 112 hours weekly" for some executives call to mind Thomas Edison's statement that "few men ever use more than 10% of their ability." Incidentally, DR. HESS says: "We have not included any particular reference to experience with women workers. By its omission we mean that our experience has been very good both as to attendance, lack of accidents, and illness in this group." The obvious comment regarding that is: "good wages, good treatment, good health." But read the article. It will make you think . . . . MISS DORWARD, in her article on "Nutrition" (page 403) told the NEW ENGLAND CONFERENCE OF INDUSTRIAL PHYSICIANS something that no one of her hearers hadn't heard before when she said "Education, of course, is a long, slow and unsatisfactory process." They could agree, as can everyone else who is doing any kind of educating, whether it is in nutrition, safety, health, or the development of skills. There are exceptions, to be sure. "Long, slow

—*Continued on page 458.*

A.S.R. Corp., Surgeon's Division 19
Surgeon's Blades and Handles
Alkalol Company, The 440
Alkalol
Aloe, A. S., Company 16
Surgical and Laboratory Supplies
American Optical Company 443
AO Goggles
American Sterilizer Company 445
Hygeaire Sanitation
Anacin Company, The 425
Anacin
Anglo-French Laboratories, Inc. 12
Hepvisc for Hypertension
Aznoe's-Woodward Medical Personnel 42
Placement Service
Ballard, James F., Inc. 42
Campho-Phenique
Bard-Parker Company, Inc. 5
Rib-Back Blades
Bauer & Black 35
Lisco Pads; Sorbant Gauze; Lisco Roll
Baum, W. A., Co., Inc. 34
The Baumanometer
Bausch & Lomb Optical Co. 419
Safety Goggles
Becton, Dickinson & Co. 24
B-D Needles
Bisodol Company, The 449
Bisodol
Breck, John H., Inc. 27
Breck Water Resistant Cream
Bristol-Myers Company 443
Sal Hepatica
Burdick Corporation, The 63
Burdick Solarium Shower
Camp, S. H. & Company 7
"The Human Back"
Carbisulphoil Company ..... 3rd Cover
Foille—for Burns
Cereal Institute, Inc. 39
Cereal Foods
Ciba Pharmaceutical Products, Inc. ..... 4th Cover
Nupercainal
Crookes Laboratories, Inc. 30
Enzo-Cal Protective Cream
Denver Chemical Mfg. Company, The 26
Acetone Test
Denver Chemical Mfg. Company, The 54
Antiphlogistine
Desitin Chemical Company 46
Desitin Ointment
Dolge, The C. B., Company 458
Handeez; Prevento; Dolcogards
Dome Chemicals, Inc. 22
Domeboro Tabs
Drug Products Co., Inc., The 448
Sulfarea; Selorea
Effervescent Products, Inc. 28
Clinitest
Ethicon Suture Laboratories 18
Ethicon Emergency Sutures
Flint, Eaton & Company 32
Sulfonamide Preparations
General Cellulose Co., Inc., The 40
Cellulose Wipes
General Electric X-Ray Corporation 409
Mobile X-Ray Unit
Health Cigar Co., Inc. 14
Sano Cigarettes
Hoffman-La Roche, Inc. 33
Cal-C-Tose "Roche"
Holland-Rantos Company, Inc. 41
The Koromex Set Complete
Hollings-Smith Co. 447
Carbex Bell
Hynson, Westcott & Dunning, Inc. 426
Mercurochrome
Ille Electric Corporation 412
Portable Unit for Hydromassage
Industrial Medicine Book Company 22
"The Mind of the Injured Man"
Iodine Educational Bureau, Inc. 416
Iodine
Irwin, Neisler & Company 437
Benzamol
Johnson & Johnson 427
Red Cross Plaster
Johnson & Johnson 1
"Zo" Adhesive Plaster
Kny-Scheerer Corporation 23
Surgical Instruments
Leeming, Thos., & Co. 2
Calmitol
Lilly, Eli & Company 64
Barbiturates
Lily-Tulip 62
Paper Cups and Containers
McNeil Laboratories, Inc. 31
Aspirocal Comp.
Medicone Company 13
Rectal Medicone
Merck & Co., Inc. 40
Cuprex
Merck & Co., Inc. 47
Penicillin
Merrell, The Wm. S., Company ..... 2nd Cover
Pan-Concemin Tablets
Milburn Company, The 53
Ply Liquid; Ply Cream
Mine Safety Appliances Company 57
Creams and Lotions
Morton Salt Company 438
Heat-Fag Salt Tablets
National Drug Company 43
Rhus Tox Antigen
New York Pharmaceutical Company 448
Hayden's Viburnum Compound
Norwich Pharmacal Company, The 50
Unguentine
Numotizine, Inc. 56
Nuzine Ointment
Nutrition Research Laboratories 422, 423
Bezon
Nutrition Research Laboratories 58, 59
Krtron
Occy-Crystine Laboratory 42
Occy-Crystine
Packwood, G. H., Manufacturing Co. 20, 21
Pax
Parke, Davis & Company 9
Kapseals Abdec
Patch, The E. L., Company 420
Thiasulfamix
Pelton & Crane Company 52
Model HP Autoclave
Powers X-Ray Service 36
Rapid Chest X-Rays
Reynolds, R. J., Tobacco Company 427
Camel Cigarettes
Riedel-de Haen, Inc. 44
Decholin
Schering Corporation 15
Estinyl
Schmid, Julius, Inc. 431
Ramses Diaphragm
Schoonmaker Laboratories, Inc. 458
V-E-M
Schuylkill Chemical Co. 62
Sulfallantoin
Seamless Rubber Company, The 29
"SR" Gauze Bandage
Searle, G. D., & Co. 17
Pavatrine
Sharp & Dohme 51
"Thermotabs"
Shield Laboratories 417
Riasol
Singer Sewing Machine Company 45
Singer Surgical Stitching Instrument
Sklar, J., Manufacturing Company 60
Surgical Instruments
Squibb, E. R., & Sons 407
Sulmefrin
Stearns, Frederick, & Company 11
Neo-Synephrine-Sulfathiazolate
Stepan Chemical Company, The 37
pH6 Skin Cleanser
Tailby-Nason Company 430
Supertah Ointment
Tampax Incorporated 55
Tampax
Tarbonis Company, The 411
Tarbonis
Tower Company, Inc. 405
Fracture Appliances
Wallace & Tiernan Products, Inc. 61
Azochloramid Preparations
Wander Company, The 439
Ovaltine
Warner, William R., & Co. 435
"Agarol"
West Disinfecting Company 441
Protective Creams
White Laboratories, Inc. 415
Neo Multi-Vi Capsules
White Laboratories, Inc. 48, 49
White's Sulfathiazole Gum
Whittaker Laboratories, Inc. 442
Cooper Creme
Willson Products, Incorporated 434
No. 780 Approved Respirator
Wilmot Castle 413
Sterilizers
Winthrop Chemical Company, Inc. 450
Pluravit
Winthrop Chemical Company, Inc. 25
Sulfathiazole-Urea Ointment
Wyeth, John, & Brother 421
Wyanoids



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DR. STARLING D. STEINER, Chief of the Maryland Division of Industrial Hygiene, has resigned from that position to become identified with Cadillac Division, General Motors Corporation.

DR. L. W. FOKER, Director, Minnesota Division of Industrial Health, is chairman of the new Industrial Nutrition Committee, established in cooperation with the Nutrition in Industry service of the U. S. Food Distribution Administration. Services offered have brought requests to this committee for assistance with nutrition problems from 17 industrial concerns.

PROFESSOR C. E. A. WINSLOW, Lauder Professor of Public Health at Yale University, has been appointed Editor of the *American Journal of Public Health*, succeeding Harry Stoll Mustard. Professor Winslow assumes his duties as Editor with the publication of the April issue of the Journal.

MISS GERTRUDE LEMIEUX has recently been added to the staff of the Division of Industrial Hygiene, Alabama State Department of Public Health, as a chemist. MISS LEMIEUX graduated from Mississippi State College for Women in 1942, with a B.S. Degree in Bacteriology and Chemistry. After graduating and prior to acceptance of her present position, she was employed as chemist at the Alabama Ordnance Works by E.I. du Pont de Nemours & Company.

DR. CLARENCE D. SELBY, medical consultant, General Motors Corporation, Detroit; COL. JOHN H. ANDREWS, executive officer, Re-employment Division, National Selective Service System, Washington, D. C.: DR. HARLEY L. KRIEGER, medical director, Ford Motor Company, Detroit; A. A. HENDRIX, personnel director, Eastern Aircraft Division, General Motors Corporation, Linden, New Jersey, and I. DENT JENKINS, personnel manager, Harrison Radiator Division, General Motors Corporation, Lockport, New York, comprise the new Advisory Board for

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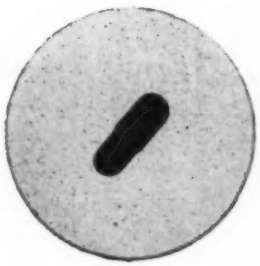

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the Placement of Veterans in Industry recently named by Industrial Hygiene Foundation. The Advisory Board was established after the release of the comprehensive report by the Industrial Hygiene Foundation on "Putting the Disabled Veteran Back to Work," and the five man panel will serve the foundation's membership and industry generally as an unofficial vehicle for the exchange of practical experience and information.

DR. EVARTS A. GRAHAM, F.C.C.P., St. Louis, Missouri, who, with his staff, is conducting the Surgical Clinics at the Thursday morning, May 11, meeting of the AMERICAN ASSOCIATION OF INDUSTRIAL PHYSICIANS AND SURGEONS, at the St. Louis "War Conference," was awarded the Charles Mickle Fellowship for 1943 by the University of Toronto Faculty of Medicine, for his work in "The Diagnosis and Treatment of Carcinoma of the Lung." On November 8, Dr. Graham was granted honorary Fellowship in the Royal College of Surgeons of England at a ceremony held in the British Embassy at Washington, D. C.

DR. H. C. DANFORTH recently became associated with the Pember-Nuzum Clinic of Janesville, Wisconsin. He was formerly physician for the Chevrolet Motor Company of that city.

DR. RALPH L. TOWNE of Kalispell, Montana, has returned to his practice at that point after the completion of a government assignment as a member of the surgical staff of the central clinic for Douglas aircraft workers in Santa Monica, California.

DR. W. PALMER DEARING, Senior Surgeon, U. S. Public Health Service, has been appointed Chief Medical Officer, effective March 1, to succeed DR. GEORGE BAEHR, Chief Medical Officer since June 1, 1941. DR. DEARING has been Assistant Chief Medical Officer of the Office of Civilian Defense since July 8, 1941, and has assisted in the planning and development of the entire emergency medical program. DR. COURTNEY M. SMITH, Senior Surgeon (R), U. S. Public Health Service, formerly Regional Medical Officer of the Ninth Civilian Defense Region (West Coast), will become Assistant Chief Medical Officer. DR. WALLACE M. CHAPMAN, Surgeon (R), U. S. Public Health Serviee, will succeed DR. H. VAN ZILE HYDE as Field Casualty Officer and DR. CHARLES C. CHAPPLE, Surgeon (R), U. S. Public Health Service will succeed DR. KARL J. THOMSON as Intelligence Officer.

DR. JULIUS BRANDWEIN, 46, Secretary of the ASSOCIATION FOR THE ADVANCEMENT OF INDUSTRIAL MEDICINE AND SURGERY, New York City, died suddenly at his desk, March 7, 1944.

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GENERAL

UNIVERSITY of Western Ontario, London, Ontario, has received $100,000 from Mrs. William M. Gartshore, widow of the former president of the McClary Manufacturing Company, to "further the knowledge of disease caused by the conditions and hazards incidental to industry, so that such conditions may be improved and such hazards may be removed."

THE Mexican Society for the Study of Tuberculosis has announced that it will hold a national convention on tuberculosis and silicosis in Mexico this coming summer. The meet, which will be the first of its kind in Mexico, is being sponsored by the public health and welfare ministry, and will feature an extensive investigation of tuberculosis and silicosis in Mexico, with particular emphasis on their relation to the mining industry.

THE AMERICAN ASSOCIATION OF INDUSTRIAL DENTISTS at its recent meeting in Chicago, decided to meet three more times in 1944. The officers and members felt that, during this formative period, opportunity should be given dentists in several sections of the country to attend meetings. Places and times are: May 9-12, St. Louis, AMERICAN ASSOCIATION OF INDUSTRIAL PHYSICIANS AND SURGEONS; October, Omaha, American Dental Association; December, New York, Greater New York Dental Society. Address inquiries to: DR. POWELL C. CARREL, Secretary, Pratt-Whitney Division, United Aircraft Corporation, East Hartford, Connecticut.

NEW YORK Medical College has been given $30,000 by Anaconda Wire & Cable Company for research projects in industrial medicine arising out of problems incident to the manufacture of the company's products. The study will determine whether occupational hazards exist and will develop means of giving adequate protection to the workers if necessary. The project is under the direction of DR. LINDSLEY F. COCHEU, director of the department of public health and industrial medicine, assisted by DR. LINN J. BOYD, director of the department of medicine, and DR. FRANCIS D. SPEAR, director of the clinical pathology laboratories.

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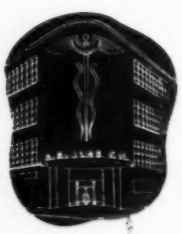

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nished all employees but not dependents. Besides company or employee medical service plans, there are statewide, physician-sponsored medical care plans, local physician-sponsored plans, the various benefits offered by Blue Cross hospitalization plans, union-sponsored plans, cooperative groups, private clinics, and ordinary insurance against the hazards of unusual illness and surgical costs by individual or group policies. Typical of the insurance recognition of the problem is the recent organization of American Health Insurance Corp., financed as a subsidiary of Commercial Credit Co. This organization was formed to offer surgical benefits to the 15 million Blue Cross subscribers and family members only.

—Saint Louis Medical Society *Weekly Bulletin*, April 7.

Dermatitis Among Welders

RECENTLY a group of women welders of a California plant, engaged in the fabrication of metal war materials, suffered an acne-like dermatitis on the neck and lower parts of the face. Inspection of the working environment revealed no unusual conditions. It was determined, however, that each of these workers at some time had worked at a job which consisted of welding an ungalvanized lug to a disc. Inspection of the discs disclosed that they were coated with a very thin film of oil which was applied at another plant. A conference with the manufacturer of the discs revealed that the oil was used primarily to aid in the stamping operation as well as to protect the iron from rust. The oil contained 30% chlorine and 20% sulphur and could be classified as a chlorinated hydro-carbon evolved by the heat of welding. These facts indicated that the dermatitis was a chloracne resulting from exposure of the skin to a chlorinated hydrocarbon vapor. Scrupulous personal hygiene on the part of the workers and the removal of the oil from the metal before welding were recommended as control measures. The California Bureau of Industrial Health find these are the first reported cases from such a cause.

—*Industrial Hygiene News Letter*, March, 1944.

Central States Society

THE annual meeting of the CENTRAL STATES SOCIETY OF INDUSTRIAL MEDICINE AND SURGERY, May 16, 1944, has the following program:

PROGRAM Chairman, J. DANIEL WILLEMS, M. D.

"The Relation of Malignancy to Trauma"—HARRY E. MOCK, Associate Professor of Surgery, Northwestern University, Senior Surgeon, St. Luke's Hospital, Chicago. Discussion.

"The Back as an Industrial Problem"—LEWIS M. OVERTON, Des Moines, Iowa. Member Board of Governors, Central States Society of Industrial Medicine and Surgery. Discussion.

"The Changing Panorama of Industrial Medical Requirements"—CARL M. PETERSON, Secretary, Council on Industrial Health, A.M.A.

"The Relation of Mouth Infection to Industrial Health; A Mouth Health Program for Industry"—EARLE H. THOMAS, M.D., D.D.S., Past President, American and Chicago Societies of Oral Surgeons; Former Assistant Professor of Oral Surgery, Chicago College of Dental Surgery.

TUESDAY Afternoon—Section on Surgery, Illinois State Medical Society, Joint meeting with CENTRAL STATES SOCIETY OF INDUSTRIAL MEDICINE AND SURGERY.

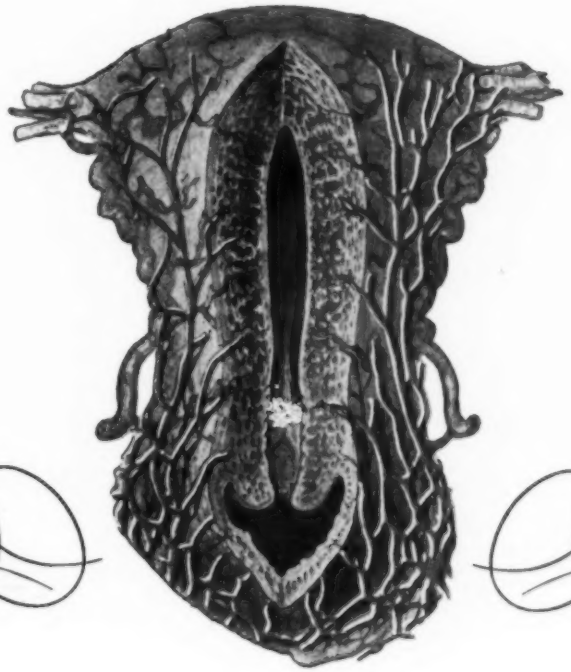
"Industrial Surgery"—H. M. MCCUISTION, Alton.

"Advantages and Limitations of the Skeletal Fixation Method for Fractures"—MANLEY A. PAGE, Chicago.

"Internal Fixation of Hip Fractures"—R. J. HYSLOP, Freeport.

Test Case

THE validity of the law enacted at the last Minnesota Legislature covering occupational diseases may be tested as the result of a silicosis award just made by the State Industrial Commission. The law provides that three medical men pass on the case before an award is finally approved. An employee of the Pyramide Granite Co., St. Cloud, filed a claim for compensation on the ground that he had contracted silicosis while at work. The industrial commission granted an award but before it can be final it must be passed upon by the medical board made up of one representative of the employer, one of the employee and one chosen by the other two. Attorneys for the granite firm have indicated they will ask a writ of certiorari to obtain an immediate review



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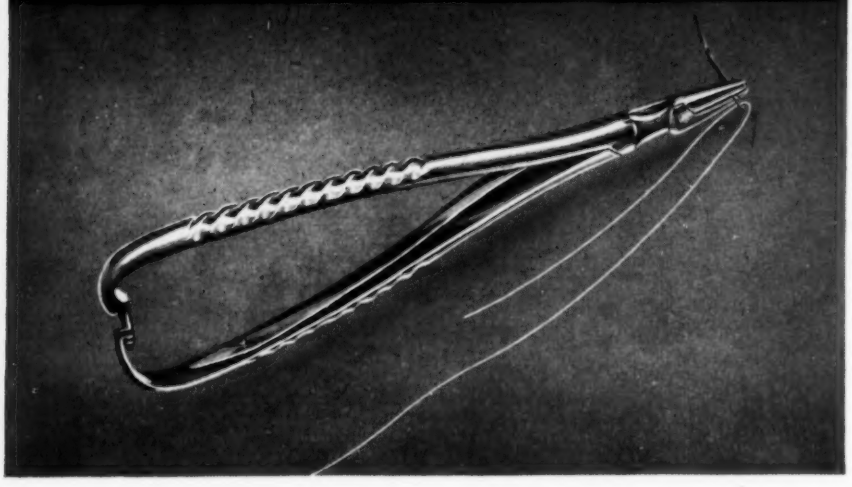

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of the action of the industrial commission before it reaches the medical board.

—*New York Journal of Commerce*, April 11.

Neoprene Reassurance

WAR WORKERS in factories that use synthetic rubber are assured by the Department of Labor that their employment need not impair their health and efficiency. Modern engineering can control injurious gases, vapors and dusts. The assurance is given in a pamphlet entitled "Neoprene," the first of several reports on a year's study of health hazards in the industry that produces tires, self-sealing gasoline tanks, de-icers, barrage balloons, lifeboats, and other tools of war. At the request of the Rubber Products Branch of the WPB, Labor Department technicians investigated every phase of workers' exposure to possibly harmful chemicals in the production, processing and fabricating of synthetic rubbers. Initiated at a conference in Akron, Ohio, in which management and organized labor participated, the survey indicated that: (1) In handling basic raw materials used in the manufacture of synthetic rubbers, relatively few workers experience danger, and this primarily in the event enclosed operations break down. (2) Many more persons engaged in processing and fabricating operations are exposed to possible hazards. (3) Engineering control of gases, vapors, irritating dusts and excessive heat is modern industry's answer to the prevention of such hazards. These controls, under qualified engineering and medical supervision, are achieving a steady reduction in the discomfort and illness experienced in certain departments before satisfactory protection was provided. (4) Few materials unfamiliar to the natural rubber industry are involved, and these are being given intensive study.

For Small Plants

THE Chamber of Commerce health committee, headed by DR. HERMAN M. BAKER, is offering aid in a program to make industrial medical service available to small plants here. DR. BAKER proposes that any industry too small to provide medical service of its own, communicate with the Chamber of Commerce, and the health committee will undertake to arrange for one doctor to serve several plants if each provides a small dispensary with rudimentary equipment. In this way the cost can be divided.

—*Evansville, Indiana, Press*, February 12.

Caustic Soda Burns

IN A SHIPYARD in Oregon, a new employee was "horsing around" in the plate pickling department and fell head first into a cold 6% solution of caustic soda. The safety director of the yard turned a fire hose on the employee as soon as he was hauled from the tank and saved the eyesight of the man who escaped with burns of the eyes and minor skin burns causing only a week's time loss. A shower with quick opening valve was later installed in the department.

—*Industrial Hygiene News Letter* March, 1944.

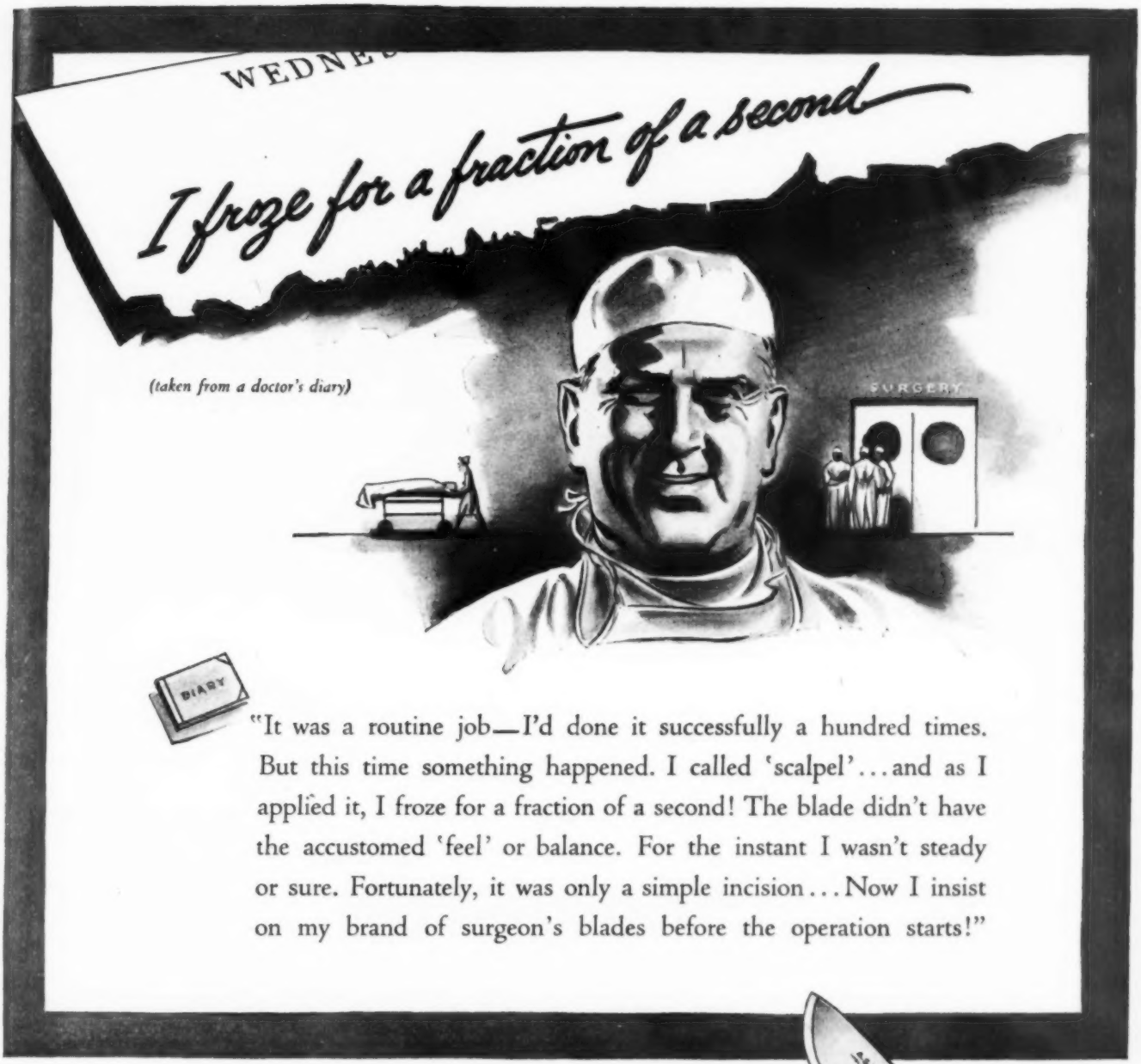
Vitamins

THE physician appears to be far and away the greatest single factor in influencing the use of vitamin preparations, it appears from data assembled by Henri, Hurst & McDonald, Inc., a Chicago advertising agency. Questioned in a sectional survey as to why they began taking vitamins, housewives replied as follows: Doctor's advice—56.5%; started on own accord—20.0%; friend's advice—14.4%; radio advertising—3.0%; druggists advice—2.3%; read about them—1:5%; don't know—2.3%.

—*Medical Economics*, April.

Women in Steel

FIRST-AID and medical facilities are better in steel than in most industries. Health and safety programs are of many years' development. Most of the larger mills have hospitals with doctors on duty or on call at all times. All mills have arrangements for caring for first-aid cases at any time. In the large mills ambulances or special cars are on call to transport ill or injured workers. All the mills visited have a pre-employment examination and the nature of this pre-employment



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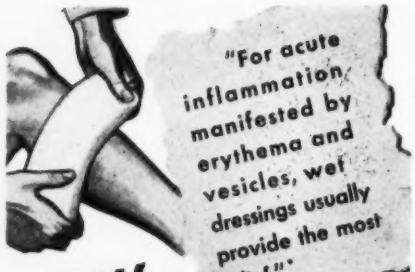

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*Schwartz, L., Med. Dir., U. S. Public Health Serv.: Manual of Indust. Hygiene, 1943, p. 174.

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physical screening varies from a quite superficial examination to a complete physical covering eyes, ears, heart, lungs, blood tests, a hernia check, and a listing of all disease and injury experience to serve as a basis for rejection or placement and for background data for future illness or injury. Some of the plants have a program of follow-up examinations for certain occupations at intervals of from three months to a year. The employees for whom follow-up examinations are required are riggers, crane operators, all who do high climbing, operate railroads, drive tractors, or control equipment that involves the safety of others, and workers exposed to fumes from molten lead or lead products. On inspection jobs where perfect vision is required, periodic eye examinations are a part of the medical program in some plants.

—From "Women's Employment in the Making of Steel, 1943," by ETHEL ERICKSON, Women's Bureau, Bulletin No. 192-5.

COMMENT and OPINION

BERNARD BARUCH has given the sum of $1,100,000 to be used for the teaching of, and research in, physical medicine. Among the specific grants: "To selected medical schools, $100,000 to develop an immediate program for the physical rehabilitation of war casualties and those injured in industry."

THE power of licensure in the various professions is not delegated to the United States by the Constitution; therefore it is reserved to the states"—and that, in a nutshell, is the reason why it is not possible to obtain a national license to practice nursing in any state. A short article, "National Registration for Nurses," presented in the March issue of *American Journal of Nursing* lists six major problems, among them payment of double registration fees—one to the state and one to the nation—which nurses would encounter were national registration possible.

—New York State Department of Labor *Health News*, March 27.

I AM, of course, aware that the subject of mandatory physical examination has, at times, been a source of controversy between labor and industry. I have seen enough serious health effects—some tragic—that might have been prevented by whole-hearted cooperation of employer and employee in the proper use of such examinations for selection and placement, and I feel strongly that labor is short-sighted in its own interest and employers short-sighted in their own costs from illness, accident and labor turnover when both sides do not make every effort honestly to iron out differences.

—From "The Employment of Women in Industry from The Health Standpoint," by L. E. VIKO, M.D., in *Rocky Mountain Med. J.*, April, 1944.

THE American doctors have made eminent progress in caring for the health of our people. Medical organizations and private hospital groups are making substantial progress toward the goal of providing adequate medical and hospital care for all. In view of this record I regard the proposals emanating from this administration for governmental intervention between the doctor and his patient as an undeserved affront to a loyal and admirable profession, and a distinct threat to the future health of our people. It is these meddlesome activities in so many spheres that properly belong to the states or to the people themselves that have led to the multiplicity of government agencies which are unsupervised and uncontrolled, and which it is impossible to supervise or control.

—GOVERNOR JOHN W. BRICKER, of Ohio, at Peoria, Illinois, February 22, 1944.

AFTER the war, Congress will probably appropriate less money for the industrial hygiene divisions of the U. S. Public Health Service, forecast DR. J. G. TOWNSEND, who is associated with the PHS. As a result, he said, states will be forced to devise ways and means of financing their own industrial health programs.

—From "Industrial Medicine Looking to Postwar Development," by CHARLES R. ROSENBERG, JR., in *Medical Economics*, April.

ONLY 16% of all the people favor a 6% payroll deduction from wages for the Federal government to provide medical care and hospitalization; only 19% favor medical care of the indigent by the Federal government. Only 13% expressed the opinion that compulsory insurance would provide a satisfactory solution to the problem of payment for medical care costs; only 24% thought it would be a good thing for the medical profession to be controlled by the national government. In contrast, 57% opposed the fixing of physicians fees; 56% opposed paying the expenses of medical students; 56% opposed the limitation of choice of physician by the national government."

—Quoted in an Editorial in *Northwest Med.*, April, 1944.

THE leaders of the Australian government now admit that the administration was too hasty in its attempt to perpetrate a wholesale transformation of health services and to abolish private practice. The original proposal called for a whole time salaried medical service with district organizations and an elab-

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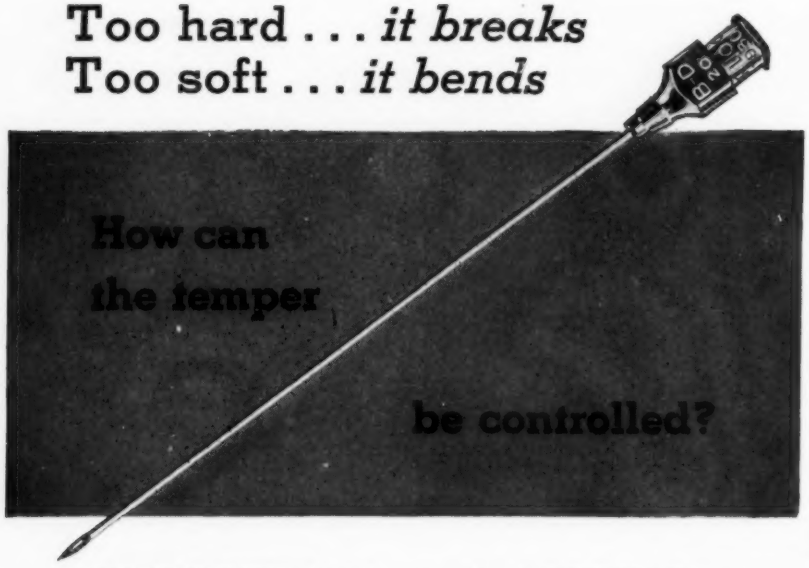

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orate system of promotions and integration of all health services. Extensive discussion modified many phases of this plan but left it still cumbersome and bureaucratic. The interim report now states that "The committee is impressed by the existing widespread opposition to the proclamation of this act and concludes from it that the scheme there suggested is unsuitable as a permanent basis for social benefits or health services for the people of Australia."

—From an editorial in *J.A.M.A.*, January 29.

Union Health Insurance

FINANCIAL worry and uncertainty — inevitable corollaries when sickness strikes a workingman's home—are being eliminated these days as more and more C. I. O. unions write non-profit group health insurance into union contracts. A number of unions have already won or are negotiating for the cooperative Blue Cross health plan benefits for workers. The non-profit Blue Cross plan includes both hospital and surgical benefits. In most cases, workers and management share costs of the benefits, each paying 50% of premiums. At the Berg Metal Company, under contract to Warehouseman's Local 26, I. L. W. U., the company is paying all costs. According to Helga Weigert, director of the C. I. O. Council Health Division here, with whose cooperation negotiations have been conducted, a recent War Labor Board ruling makes it unnecessary to obtain WLB approval of health benefits in contracts where the employer pays part or all of the costs. "As a matter of fact," Miss Weigert said, "the WLB has expressed itself in favor of such company payments as indirect, non-inflationary wage raises ultimately benefiting production." The Southland Health Division advocates non-profit health insurance plans, rather than commercial plans, irrespective of whether or not part payment of premiums is made by employers.

—San Francisco *Labor Herald*, quoted in *California & West. Med.*, March.

Air Sanitation

THE history of "air sanitation" is closely associated with the pioneer work of DR. RICHARD OVERHOLT, of Boston, who has carried on extensive research, particularly in relation to hospital operating rooms and the prevention of postoperative infection. He was successful in reducing the overall infection rate by more than 30%. R. A. BALLOU, of Schirmer-Atherton Company, Newark, New Jersey, decided to try out a similar plan to prevent cross-infection in a business office. Adopting hospital techniques, this firm, which employs 70 men and women, protects them from germs with a constant daily radiation barrage from 15 carefully placed "air sanitation guns." Graph chart records kept from December 1 to March 1 reveal an average reduction of absenteeism due to illness of better than 25%, while the decrease effected during the height of the influenza epidemic amounted to 66 2/3%.

—Hanovia Chemical & Mfg. Co. release.

Industrial Eye Hygiene Program

INDUSTRIAL HYGIENE DIVISION, U. S. Public Health Service, in cooperation with the offices of the National Society for the Prevention of Blindness, and A.M.A. Joint Committee on Industrial Ophthalmology and Otolaryngology, has been developing and carrying out a program in eyesight protection in industry. Assistant Surgeon (R) JOSEPH LO PRESTI was detailed to the National Society for the Prevention of Blindness, New York, in July, 1943, for this purpose. In the past, work in this field has been directed mostly along eye protection and safety lines. The equally important aspect, visual job analysis, has not received the study nor emphasis it warrants. By job analysis is meant the correlation of visual skills or abilities of employees, with job performances based on various criteria, such as speed of learning, rate of work, accuracy of work, amount of spoilage, absenteeism, and accident proneness or frequency. In addition, no serious attempts have been to establish minimum visual requirements for different types of occupation. For these reasons the scope of the industrial eye hygiene program was made broad enough to encompass and emphasize these aspects; in fact, to include all important aspects of vision in industry. Because of the acute shortage of ophthalmologists and allied professional groups engaged in eye care and eye service, other methods of visual examination had

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Accepted for advertising in the Journal of the A. M. A.

to be adopted to reach a sizeable industrial population. Three so-called screening devices were found to be already available, one of which is still in the experimental stage. In order to evaluate the reliability of one of these devices, namely, the Ortho-Rater, a study was conducted at Stevens Institute, Hoboken, New Jersey. A group of 336 first-term students in the drafting course were tested by means of a simplified clinical procedure and by the Ortho-Rater. From five to six minutes per subject were taken for the examination. Data from this study are now in the last stages of analysis and it may be tentatively concluded that this screening device may be practically employed in industry to study visual skills. A visit was made to the Visual Institute at Purdue University, where the Ortho-Rater was developed. Methods of obtaining vision data and correlating them with job performance were studied with a view to adopting some of them in field work. A comprehensive industrial visual survey is now being carried out in Connecticut, through the Bureau of Industrial Hygiene, Connecticut State Department of Health. The objectives are: (1) To obtain a cross-section of industrial vision practices in a typical, concentrated industrial region engaged largely in war work; (2) to compare various methods of examination, particularly screening tests, for vision and (3) to derive recommendations for methods of appraising and improving existing visual conditions, both of employees and plants which may serve as a pattern to be followed throughout the country. Six plants have been thoroughly studied to date in the Hartford region working through the medical department of each plant. Whenever practical, employees were tested by various screen procedures including the Ortho-Rater, Vector-graph, and, on one occasion, with the Telebinocular, visual acuity (distance and near) muscle balance, vertical and lateral (distance and near) color vision, depth perception (stereopsis) data were obtained. In addition, the Industrial Eyesight Protection Appraisal Form (Publication No. 402B —National Society for the Prevention of Blindness) was filled out for each plant covered, after consultation with the person responsible for the eye program in the plant. Items checked on this form include: (1) *Employee Data:* General medical supervision and special provisions made for eye services; safety items; first-aid facilities; other special eye services, such as screening, periodic re-check and examination for particular exposures; and provision for supplying eye wear and appliances. (2) *Plant Job Data:* Illumination, eye hazards and provision for eye safety and protection. This appraisal form will be sent to at least 30,000 industries by the War Production Board. In line with this survey, and anticipating that industry will seek ophthalmologists to assist in correcting conditions which may be found, the National Society for the Prevention of Blindness, with the cooperation of the Chairman of the Joint Committee on Ophthalmology of the American Medical Association, is planning a seminar on industrial ophthalmology to be held in New York City at an early date. It is hoped that this will bring forcibly to the attention of the management of 40,000 industries the need for an adequate eye conservation program in industry.

—*Industrial Hygiene News Letter*, March, 1944.

Canadian Industries Limited

PERHAPS no better example exists, certainly as a general cross section of the applications of medicine and protective health measures in industry, than can be found today established within the chemical industry. No apology is needed for the introduction of the chemical industry, as represented by C-I-L, at this point because, firstly, we are on home ground in discussing the medical services already established to meet its own peculiar conditions and needs and, secondly, because within the chemical industry, with its manifold processes and operations, are to be found as wide a range of exposure potentials as are prevalent in any other industry or perhaps combination of industries. Leaving aside from this general and neces-

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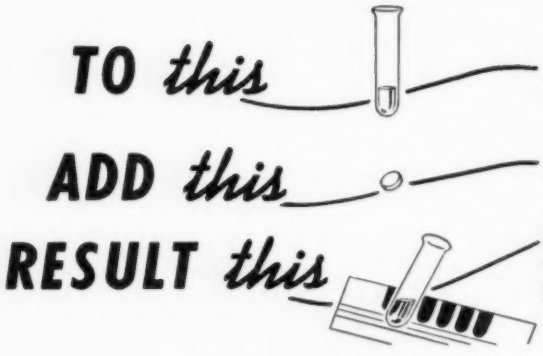

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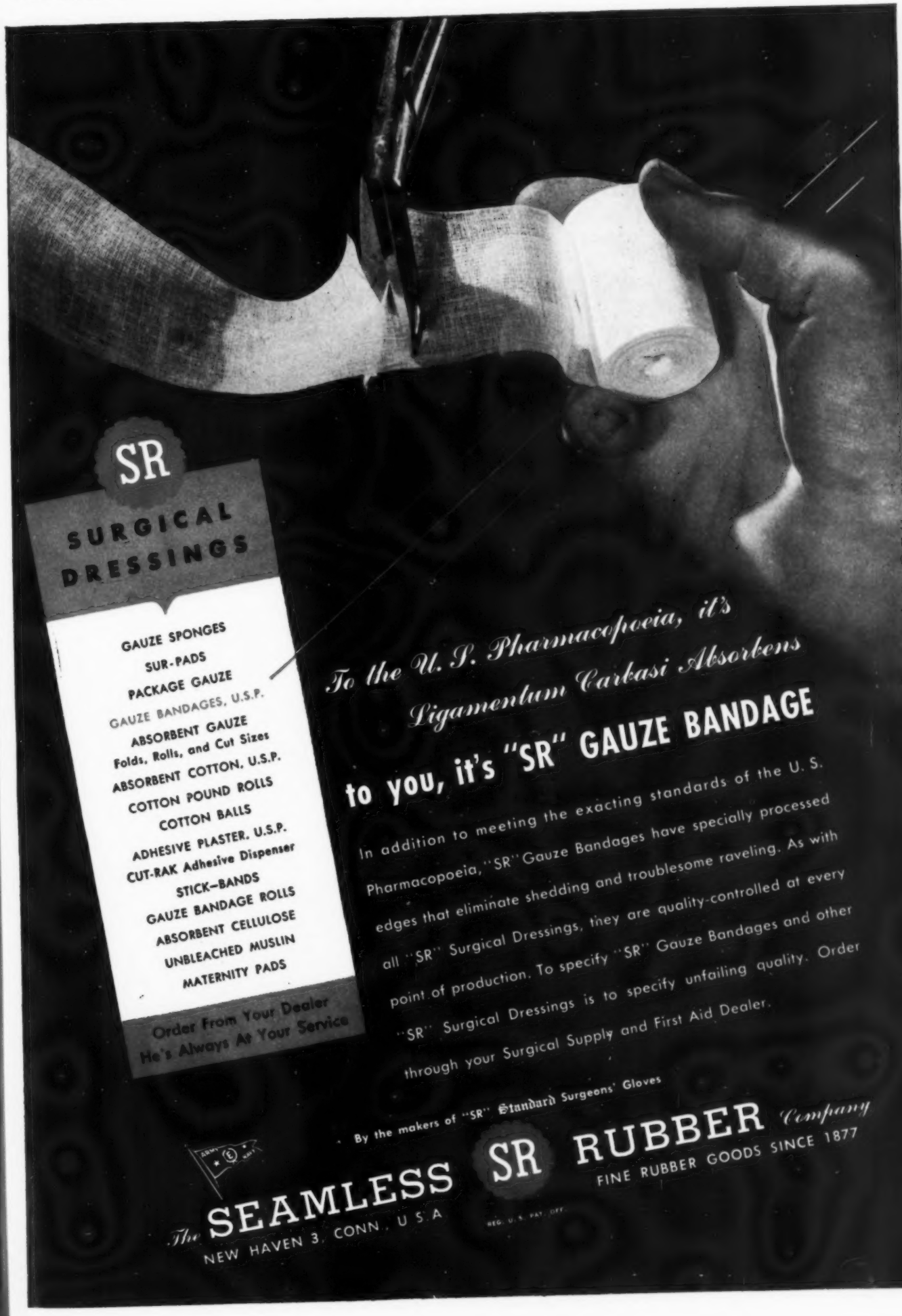
sarily brief survey, the ordinary industrial hazards which can be grouped in the general classifications of safety and accident prevention, and for which the very best of first aid and medical attention is provided, let us consider for a moment the other peculiarities of the chemical industry which require, if not demand, the constant vigilance, research and practice of the industrial medical staff working in conjunction with the skill of the engineer and the willing and close cooperation of management and, more particularly, of the workers themselves. It is not necessary to catalogue here the hazards to which the worker in the chemical industry is exposed in the course of his duties, but the whole range of occupational diseases is covered, from minor skin irritations to the various degrees of toxicity that may result from the handling of such explosives as TNT. Just as the war brought new and tremendous production problems to the chemical industry, the training and education of new supervisory staffs and the selection and classification of thousands upon thousands of men and women, so it increased the necessity for and expanded the facilities which had to be provided to care for the health problems, both occupational and otherwise, of this vast army of wartime workers. Here then in these large chemical, explosives, ammunition, and shell-filling plants, some of them with residential communities, functions a qualified medical staff with a complementary force of graduate nurses, in some instances numbered by the score or more. Here then, also, are fully equipped hospitals complete with surgery, wards, and emergency operating rooms for all but the more serious cases. In the production lines, too, are the first aid stations with nurses on every shift, and in the medical centre are the doctors who watch constantly over the health of employees engaged in the handling, mixing or contact with the raw materials used in each plant's specific operations. And the remedies found may be biological, physiological, psychological, or a matter for engineering rectifications through ventilation or some other such utilitarian procedure. Not only does the Works physician become interested in the cause, effect and remedy for industrial illnesses, but by pre-employment medical examination he is able to assist materially in the proper selection and placement of the new employee in the type of work for which he or she is found to be best suited on the results of physical examination. And through systematic and periodic check-ups among employees, it has been possible to determine even physiological types that were subject to illness or infection upon exposure, and to switch them to different spheres of operations in order to safeguard the health of the worker and to lessen the causes for possible absenteeism or interruption in essential production. One might and could go on to greater length recounting the many ways in which the industrial medical staff have stood side by side and behind the war worker both day and night to protect him from himself in his new environment and conditions of work, always to ensure, in the matter of personal hygiene, general health and mental and physical strain and stress, that he was up to the job and that the job provided his best field of labor according to his physical standard.

—From "Preventive Medicine is Important Partner in Industrial Management," by F. M. JONES, M.D., in *C-I-L Oval*, Montreal. Thirty-five full-time and 15 part-time physicians and some 100 nurses safeguard the health of wartime workers in the chemical, explosives, ammunition and shell filling plants managed and operated by Defence Industries Limited for the government. Fifteen part-time doctors and 12 nurses attend to the occupational health of employees of C-I-L at its various Works and at Head Office. DR. F. M. JONES is supervisory Medical Officer of both C-I-L and D.I.L.

Occupational Diseases

OCCUPATIONAL diseases are reportable in 24 states. The diseases and conditions which are reportable vary in the different jurisdictions. In nine states (Colorado, Georgia, Iowa, Kansas, Kentucky, Louisiana, New Mexico, South Carolina, Washington) reports are required under state health department regulations; in 10 states (Alabama, Connecticut, Maine, Minnesota, Montana, New Hampshire, New Jersey, New York, Rhode Island, Wisconsin) reports are made pursuant to statute; and in five states (Maryland, Michigan, Missouri, Ohio, Pennsylvania) there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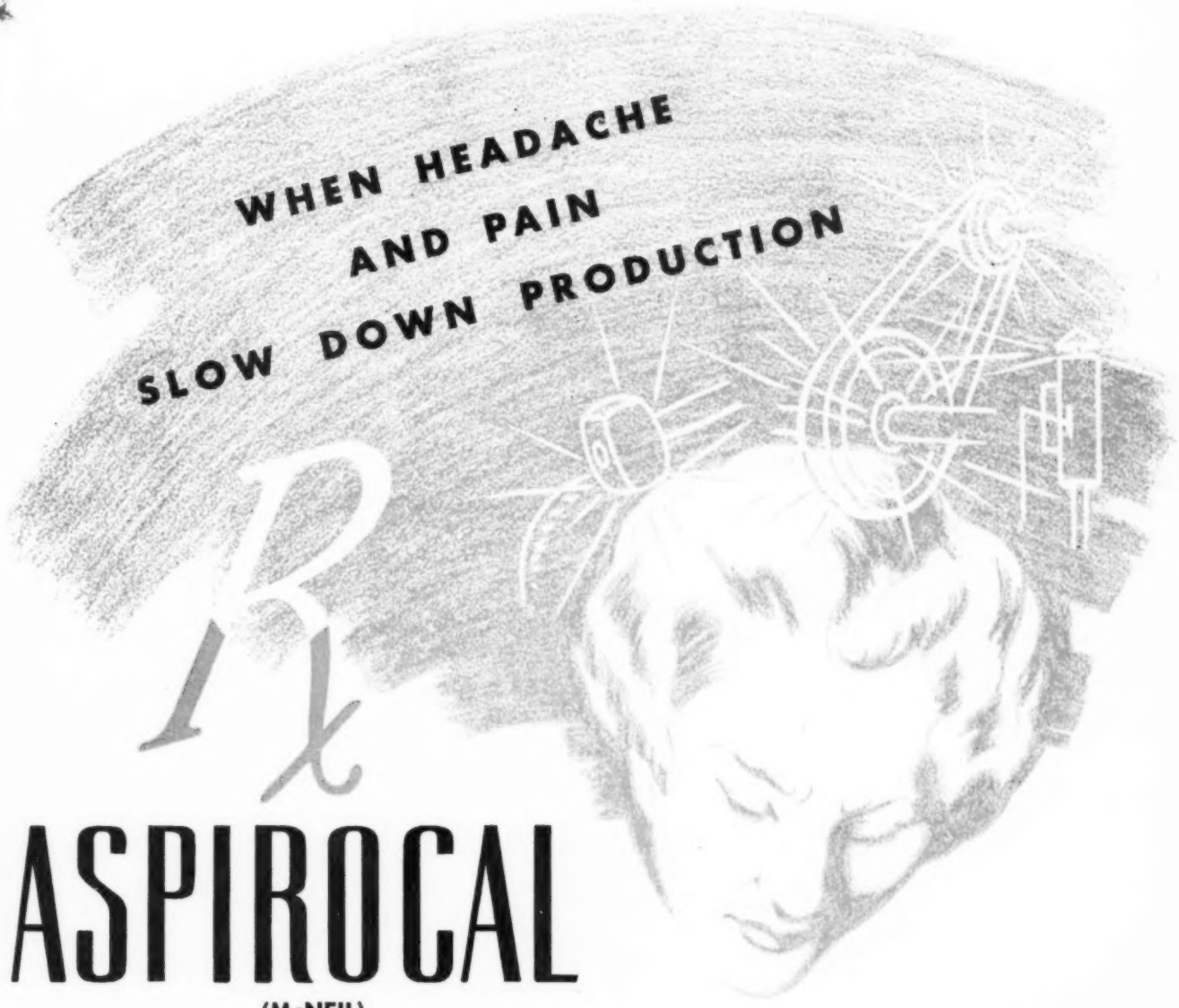
are both state health department regulations and statutory provisions requiring reports. In those states having statutes on the subject such laws provide for reports to be made to the health authorities in 12 states (Alabama, Connecticut, Maine, Maryland, Michigan, Minnesota, Missouri, Montana, New Hampshire, Ohio, Rhode Island, Wisconsin); to the labor authorities in two states (Maine—certain cases of compressed air illness, New York) and, in certain cases of lead poisoning, to both the health and labor authorities in three states (New Jersey, Ohio, Pennsylvania). While Minnesota has been listed above as requiring reports to the health authorities pursuant to a 1939 law (sec. 144.34 of the 1941 Statutes), mention should be made of a 1913 law which is still carried in the 1941 Statutes as section 175.33 and which provides for reporting to the industrial commission. However, the later law covers the same and more diseases than the earlier law; and, because of this, only the later law was considered in the analysis above. The Missouri statute declares especially dangerous to the health of employees "The carrying on of any process, or manufacture, or labor . . . . in which antimony, arsenic, brass, copper, lead, mercury, phosphorus, zinc, their alloys or salts, or any poisonous chemicals, minerals, acids, fumes, vapors, gases, or other substances are generated or used, employed, or handled by the employees in harmful quantities, or under harmful conditions, or come in contact with in a harmful way." Every employer engaged in carrying on any such process or manufacture is required, as often as once each month, to have all employees who come into direct contact with the poisonous agencies or injurious processes examined by a physician to ascertain the existence of any industrial or occupational disease or illness. The examining physician must make a report of the physical examination, and if any such disease or illness is found shall so report. The statutes of New Jersey and Pennsylvania and one of the pertinent statutes of Ohio have particular reference to lead poisoning and declare certain work especially dangerous to the health of employees who, while engaged therein, are exposed to lead dusts, fumes, or solutions. At least monthly examinations of such employees by a physician are required, and a report must be made on what he believes symptoms of lead poisoning. A Massachusetts law provides that the state department of labor and industries may require every physician treating a patient whom he believes to be suffering from any ailment or disease contracted as a result of the nature, circumstances, or conditions of the patient's employment to report such information relating thereto as it may require. The department may issue a list of such diseases which shall be regularly reported upon by physicians and may add to or change same at any time.

—WILLIAM FOWLER, U.S.P.H.S., in *Public Health Reports*, 59:10, March 10.

Sixth Medical Seminar

AMERICAN Mutual Liability Insurance Company's Medical Seminar, in Boston, last October, was the sixth in its series, held in various cities since 1939. Papers were read by DR. WILLIAM A. BISHOP, Medical Consultant for the American Mutual Boston Clinic and associate physician at Massachusetts General Hospital; PHILIP DRINKER, professor of industrial hygiene, Harvard School of Public Health; DR. LEROY U. GARDNER, director, Trudeau Foundation and Saranac Laboratories; and DR. JOSEPH C. AUB, professor of research medicine, Harvard Medical School. DR. A. WILLIAM REGGIO, senior surgeon, U. S. Public Health Service, conducted a panel discussion of the medical questions raised. DR. STANLEY LEVENSON and DR. FRANCIS H. L. TAYLOR, of Boston City Hospital; DR. HENRY C. MARBLE, DR. DONALD G. ANDERSON and DR. BERNARD MAISEL also participated in the program. The following are brief notes from



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the seminar: *Hope for Diabetics in War Work.* DR. BISHOP said they are employables and their services should be enlisted by employers in suitable war jobs. He cautioned, however, against assigning them to hazardous jobs or heavy work if their condition is such that the disease could be temporarily aggravated by infection or injury. He warned that he was referring to controlled diabetics under regular treatment—an uncontrolled diabetic is a menace to himself and others. . . . *Flash Burn Aid.* Describing the so-called eye flash burns, suffered by 40% of the welders in shipyards, PROFESSOR DRINKER said that this painful injury to the eyes could be eliminated by careful use of ordinary colorless safety goggles with shields on the side. Speaking on the serious effect of welding fumes, a temporary disturbance which could be cleared up in a short time, he said, "A great effort is being made by the Maritime Commission to procure better ventilation in double bottoms of ships under construction in order to prevent these so-called welding fumes." . . . *Aluminum Dust Preventive for Silicosis.* Metallic aluminum has proved successful experimentally in prevention and checking of the progress of silicosis, declared DR. GARDNER. He underscored the fact that the aluminum dust must reach the same cells reached by the quartz dust which causes deterioration of lungs and membranes. He told of gratifying experiments in his own laboratory, and described the enthusiastic response of miners among whom the powder has been tried. . . . *Shock and Plasma Therapy.* DR. AUB told the seminar that a large part of shock is due to the loss of a large volume of blood from the area immediately around a wound, and emphasized the need of blood plasma being used quickly before shock sets in. . . . *Cocoanut Grove Victims' Treatment.* DR. LEVENSON and DR. TAYLOR told of using plaster of Paris bandage with good results in the treatment of burns of Cocoanut Grove fire victims. The casts reduced infections, immobilized the burned area and were easy to apply. The major achievement in the advance of burn therapy was the measurement of the amount of protein needed to offset nitrogen loss through burned areas and compensate for the excessive amount needed to rebuild body tissue. Unsolved as yet and slated as the chief study for the research staff during the coming year was the cause and cure of the anemia that follows serious burns. . . . *Care of Hand Injuries.* A large percentage of industrial injuries that slow up war production involve the hands of workers, yet frequently both first-aid and early definitive treatment are so inadequate as to cause crippling, DR. MARBLE stated. In an informal clinic, DR. MARBLE cautioned against too great concern for immediate closing of a wound or fracture while ignoring complete and needed diagnosis. . . . *Sulfa Drugs not Panacea.* DR. ANDERSON and DR. MAISEL warned that use of these "miracle drugs" can be greatly overdone. The medicine affects all parts of the body and not always beneficially. Their use should be restricted to the medical profession and then only when needed to cure rather than to prevent infection.

—*American Mutual Magazine,* March, 1944.

Postwar

YOUR committee was much impressed with the fact that in addition to the greatly increased tempo in the control of industrial environmental factors affecting health, it noted that much greater emphasis is being placed on the application of public health procedures concerned with the prevention of non-occupational disease with consequent increase in this field of work, particularly in relation to tuberculosis control through x-ray programs for the industrial population; dental hygiene through meetings of committees of the dental and medical societies, and programs instituted in industry; nutrition through lunch box demonstrations, advice on cafeteria management and formation of nutritional committees; all these pointed up and emphasized through health education activities directed

A pleasant way to take vitamins (and milk)

Cal-C-Tose 'Roche'—a happy solution for the finicky, undernourished patient who cannot take tablets or capsules or who has grown tired of plain milk. Cal-C-Tose contains generous amounts of vitamins A, B_1, B_2, C, and D plus calcium and phosphorus, in an appetizing cocoa-malt base. Two heaping teaspoonfuls mixed with warm or cold milk makes a delicious "hot chocolate" or refreshing "milkshake." Supplied in 12-oz and 5-lb containers . . . .

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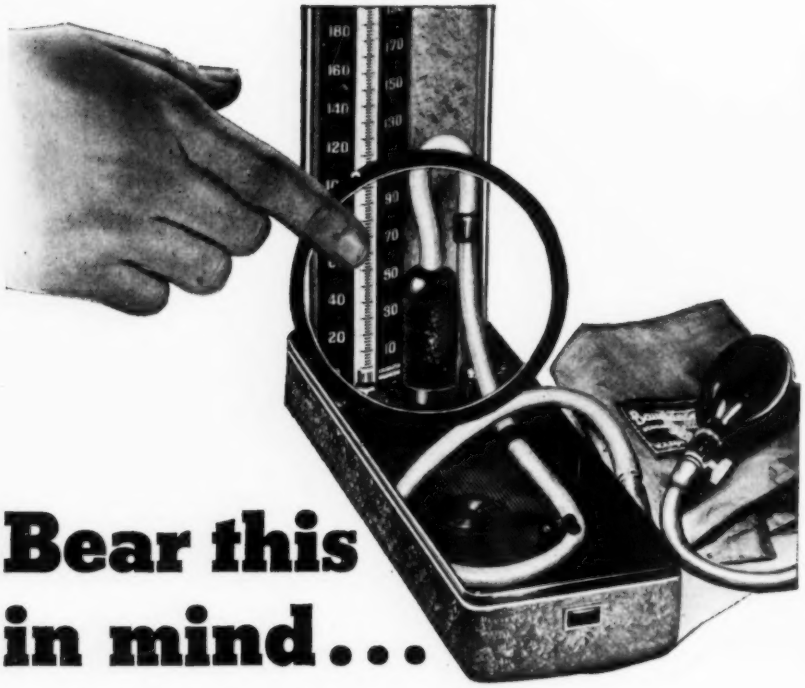

Bear this in mind...

THE BAUMANOMETER

being a true mercury-gravity instrument, operates on the fundamental principle by which other types of bloodpressure instruments are periodically checked for accuracy. Every Baumanometer is consistently accurate... it must be, because its very functional operation is based upon the immutable law of gravity.

This is but one of many features that justify your insisting upon Baumanometer accuracy, simplicity and reliability . . . the inherent characteristics which provide the optimum in trouble-free bloodpressure service.

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Lifetime Baumanometer STANDARD FOR BLOODPRESSURE

W. A. BAUM CO. INC. NEW YORK
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to the industrial population and reaching them through the close collaboration between industrial hygiene bureaus and the industrial population. This, indeed, is industrial hygiene in its best and broadest sense. Continued and increased effort made along these lines cannot but fail to reflect itself in a happier, healthier people. The provision of better medical facilities, particularly in the smaller plants, is still a major problem, but real efforts are being brought to bear upon it through discussions of the problem in industrial medical committees of the state and county medical societies and through dissemination of information to those plants and to the doctors who serve them on the advantages and profit an adequate medical service provides. Many changes will occur when industry reverts to peacetime operations, and undoubtedly new materials will be used in new operations to produce materials and products new to all of us. Most industrial hygiene units will see the desirability of carefully following this change, and will probably conduct re-surveys of plant operations, methods of controlling hazards, and medical facilities, and will consult with plant protection committees to make sure that provisions are made for continuing our vigilant work of the protection and promotion of the health of industrial workers. The industrial physician is presented today with the unique opportunity of looking ahead and planning for changes to improve the plant environment when the change-over from war production to peace production occurs. He should be able to have plans sufficiently developed so they can be carried out during the transitional period and will not have to be put in after peace production, for then it will be more difficult to do. Such an opportunity has rarely been offered the industrial physician to apply his knowledge of preventive disease and promotion of health on such a plant-wide scale.

—From the Report of the Industrial Hygiene Committee of the State and Provincial Health Authorities of North America, 1943.

WMC Reports . . .

LACK of adequate in-plant and community facilities—health, shopping, feeding, etc.—are deterrents to keeping women on the job, WMC reports. An area director records the absenteeism in a Delaware war plant at 30%, due to illness. But, said WMC officials, "no efforts are being made to ascertain the causes and prevent their continuation." A Georgia community reports that 90% of the absenteeism in its war plants is due to inability to get sufficient medical care in the area or the necessity for workers to return home to arrange for medical care for their dependents. The hospital in the community estimated that daily absenteeism could be reduced 10 to 20% if visiting nurses could make home visits to care for workers and their families. An Iowa war plant reported that more workers are needing medical care now than ever before. Shortage of medical facilities is not confined to small establishments or isolated communities. Large cities on the West Coast, for example, complain that lack of medical services impairs workers' efficiency and results in heavy absenteeism. Recent reports from one West Coast city in which 35,000 workers are employed in four shipyards—many are women—are that no full-time plant physician was available. In another West Coast ship-building center, where 27,000 workers are employed, there was only a part-time physician at last reports. In both areas community facilities are swamped. In a Michigan war center patients are obliged to wait long hours in doctors' offices; women workers must take off time for the visits. In a Texas shipbuilding area a county health nurse is trying to serve 5,500 children. She reports considerable absenteeism is related to shortages of medical and nursing care.

—OWI Release.

They Say . . .

CONGRESSIONAL RECORD: "Senator Overton. It looks like nearly every bill that comes up is trying to socialize medicine one way or another. It is sticking its nose in here and sticking its nose in there." . . . *Report of Social Security Board:* "Within localities, moreover, sickness varies according to income level. The chance for health, and even for survival, is least among

Absorption SPEED . . . increased by RESEARCH

There's speedy "pick-up" in Curity LISCO Pads . . . because Bauer & Black research developed specially processed Densor Cotton . . . high in capillarity . . . efficient in retention.

Each Lisco Pad contains a fine web of this high capillarity cotton—wrapped in absorbent gauze. Thus in this *single* dressing, research has given you *two* essentials for efficient wound care . . . speedy pick-up of wound fluids *and* the natural retention capacity of cotton.

The 3 x 3 Curity LISCO Pads are packed in cartons of 25 and 100 . . . 4 x 4's in hundreds only . . . each pad individually enveloped and sterilized after packaging.

Cut the size you NEED . . . for economy

Packed in the sturdy Sorbant dispenser-containers, both Lisco Rolls and 8-ply Gauze dressing rolls are easier and more economical to use.

One hundred yards of dressing material, 4½ inches wide, is mounted on a free-rolling spindle in the carton. You draw the dressing through a slot in the side . . . measure the length you need against printed yardstick on the carton . . . snip off the exact amount you need. The rest remains in the sealed carton, protected from dust.

You'll find scores of uses for *both* these handy, practically packaged dressings every day.

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Thousands OF CHEST X-RAYS
...in half the number of minutes
● WITHOUT SACRIFICE OF DIAGNOSTIC QUALITY, full size 14" x 17" radiographs, at the remarkable speed of 150 per hour, are normal production accomplishments of the Paper Roll Method, pioneered by POWERS RAPID CHEST X-RAY SERVICE. This widely endorsed method for large group examinations affords the optimum in accuracy, time-saving convenience and economy.
HERE ARE THE FACTS
Low cost protection—One price, based upon the total number of persons radiographed within a determinable period, covers the cost of this important service. Included are the services of our own experienced operators and portable, shock-proof equipment.
Minimum production loss—Each subject need be away from his duties for only 10 minutes or less to have an exposure made that provides a permanent record, individually identified for file reference.
There is no obligation—Write for comprehensive data and request our qualified representative to call. We will gladly prepare an estimate for the considerate action of your Board.
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the poor." (The Wagner Bill does not contemplate raising the income level.—Editor's Note.) . . . *Columbus Dispatch:* "Dr. A. R. Mangus, rural sociologist, urged Ohio rural residents to 'do something about it' by discussing group health plans and studying the merits of tax-supported medical and hospital service." (All county medical societies please note. —Editor's Note.) . . . *The Ohio Co-operator:* "Every local consumer co-operative in the United States should make plans now to open a medical care department as soon as the war is over. This is urged by Dr. James T. Warbasse, president emeritus of The Cooperative League of the United States." . . . *New York Times:* "Mr. Williams (Claude A. Williams, executive director, Texas Unemployment Compensation Commission) then asked, 'What do you think will happen if a man can make more by being idle than he can by working? You can bet he will be idle. The bill (Wagner Bill) puts a premium on being idle."

—*Ohio State Med. J.*, March, 1944.

Nostalgia

PARTLY so the Editor can see what it is like, and partly to give the readers of the *Rocky Mountain Medical Journal* a breathing space, we intend in the near future to get out a medical journal—one like we used to have. In this issue, there will be no editorials, articles or fillers on the subject of medical economics. The names of Wagner, Murray and Dingell will be conspicuous by their absence. We are going to bury our head in the sand and be oblivious of their presence. There will be no Beveridge Plan, no panel system, no Physicians' Committee, no United Public Health League. Just a medical journal. For just one issue.

—*Rocky Mountain Med J.*, April, 1944.

Indiana Conference

AMERICAN industry is meeting a critical and tremendous medical problem in its efforts to rehabilitate and employ discharged war veterans, said DR. VICTOR G. HEISER, medical consultant, National Association of Manufacturers, who was in Indianapolis Wednesday to address the second annual industrial health conference of the Medical Association. DR. HEISER said 1,300,000 men already had been discharged from the armed forces and that at least one-third had been discharged because of some form of psychoneurosis. Placing these men in the right kind of job means their salvation. American business men, therefore, are organizing to meet this problem and have done "a magnificent and brilliant job in this respect." More than 500 representatives of the medical profession, industrial management, labor and the armed forces attended the conference held at the Indiana University medical center. The consensus among doctors and health administrative officials, voiced in Wednesday's session and in informal office discussions, was that the medical profession is completely cognizant of its responsibilities in the training of industrial physicians.

—*Indianapolis News*, April 19.

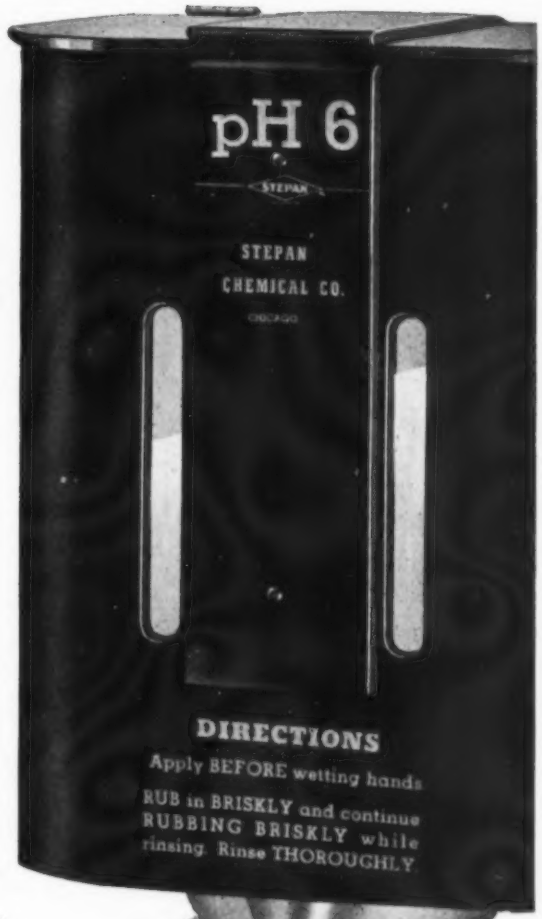
COLONEL PECK (LIEUT.-COLONEL SAMUEL PECK, U.S.P.H.S.) is charged with the responsibility for preventing serious outbreaks of skin diseases in the nation's war industries. 'Skin diseases due to industrial irritants cause 75% of all occupational illnesses and are topped only by accidents in causing lost man hours,' he said. 'In no other state is a more concerted effort being made to prevent such diseases than that which is being made in Indiana. Physicians, industrialists, and workers, operating under the guidance of DR. LOUIS SPOLYAR, director of the Industrial Hygiene Division of the Indiana State Health Department, have been doing a wonderful job.'"

—*Indianapolis Star*, April 19.

Hiring Women

APPLICANT should be given a pre-employment physical examination. From this can be determined (1) physical condition of applicant, (2) fitness for work, and (3) types of work on which applicant can be placed. Plant doctors give an examination that usually includes blood and urine tests, skin examination, sometimes x-ray of the chest, and whatever additional tests are

GRIMY HANDS NEED NOT LEAD TO "Factory Hands"*



**Many factory workers have a skin condition which we term "Factory Hands" . . . raw, red defatted hands which cause discomfort, embarrassment and inefficiency. If unchecked, this irritation may result in dermatitis.*

Grimy hands lead to "Factory Hands" when workers wash up with strong, caustic soaps, or with harmful solvents, such as those employed in their work. Providing mild but ineffectual soaps does not help . . . because workers won't use them.

But "Factory Hands" *can be checked* . . . by equipping washrooms with a skin cleanser which is safe, speedy and convenient to use. Stepan pH6 is such a cleanser. It gently yet speedily removes all common types of industrial grime . . . even grime which stubbornly resists harsh alkaline soaps. Its use leaves the skin smooth, clean and supple and causes no burning, dryness or cracking. It helps materially to reduce chapping and can usually be applied without stinging to normal hands which have been nicked and cut.

Of utmost importance, workers will not hesitate to use pH6 . . . because the special dispensing method pictured here was designed for speed and convenience. Try pH6 yourself! For free samples and complete technical data, clip and mail the coupon!

STEPAN
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pH6
TRADEMARK
A sulfated oil industrial skin cleanser . . . speedy and safe.

See novel and interesting demonstrations of pH6 in booths
40 & 41
at the Convention, May 10-13

THE STEPAN CHEMICAL CO.
1353 North Branch St., Chicago 22, Ill.

Gentlemen: Please send samples and circular on pH6. No cost or obligation.

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EASY TO USE!

This dispenser is equipped with a special push-up valve which simultaneously discharges both pH6 Liquid Cleanser and Non-Abrasive Cornmeal Scrubber. The Scrubber supplements the chemical action of pH6 with a mechanical "wash-cloth" action essential for removing grime embedded in the skin crevices. Practically all types of washroom equipment can be fitted with these Stepan Dispensers.

. . . AND ECONOMICAL, TOO!

pH6, a sulfated oil of dermatological quality, actually costs no more per pound and no more per wash than better grade industrial powdered hand soap. It is practical and inexpensive for plant-wide use.

PEDICULOSIS

must be relieved *Quickly* among

WAR WORKERS

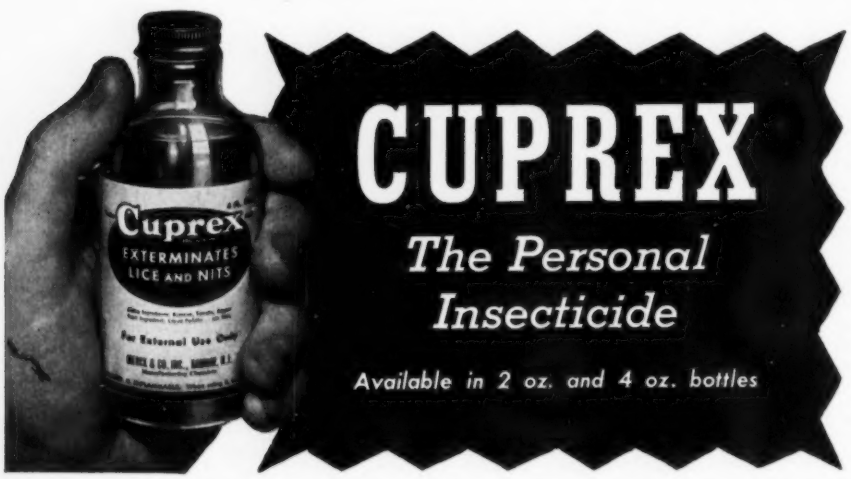
Early discovery, and immediate and effective control, are important in the treatment of Pediculosis among war production workers. Unless proper steps are taken, a single case of Pediculosis may lead to infestation of other employees.

Cuprex is a valuable aid to the industrial physician who bears the responsibility of having to discover and check any condition which may impair the efficiency of the workers under his care.

Cuprex therapy is simple. One treatment—of from 15 to 30 minutes—destroys the nits as well as the lice. Cuprex requires no messy or repeated applications, and the patient may return to his job without delay, and without embarrassment.

Literature on request

MERCK & CO., Inc. *Manufacturing Chemists* RAHWAY, N.J.



called for to meet various job requirements and protect the woman worker. It should be sufficiently thorough to discover physical defects, such as bad pelvic condition or varicose veins, that make some types of job hazardous. A few jobs are more hazardous to women than to men, especially where certain chemicals are used. The medical history of the applicant should be on record. For crane operators in a navy yard, special eye and ear tests are given to women, with emphasis on depth perception, a neurological examination, and blood pressure. A shipyard that has a rigid pre-employment examination, including the Wassermann test, sends positive cases to the state health clinic, and a strict check on visits to the clinic is kept by the head of the company's hospital. In a navy yard, if the Wassermann test is positive, the applicant has the choice of going to a private physician or to a clinic for treatment. A steel mill has a strict medical examination for applicants, checking eyes, ears, heart, lungs, blood test, and for hernia and other diseases or effects of diseases. Another steel company reports a similar rigid pre-employment examination which, when combined with the study made of all jobs as to fatigue, and weight to be handled, enables the company to select the proper person for the job. "A person thoroughly able on one job might soon give out on another job." In an aircraft engine-parts factory, the pre-employment examination is a general physical with special emphasis on eyesight, since so much of the work is close inspection that requires good vision. A rubber-products plant examines eyes, takes Wassermann, checks heart and lungs, and records medical history. There is a follow-up of all persons who appear anemic.

—From "When You Hire Women," Women's Bureau, Department of Labor, Special Bulletin No. 14, 1944.

Quartz Crystals

THE fabrication of quartz crystals for use in radio communications was given great impetus by the war. An industrial hygiene survey of this industry was undertaken, therefore, to determine whether or not there was a health hazard from exposure to quartz (free silica) dust. Six plants were visited in connection with this survey, employing from 15 to 500 people each. Some of the plants expected to expand several-fold in the near future . . . In spite of the exceedingly rapid expansion of this industry, the health of the workers has, in general, been protected against a possible serious source of quartz dust exposure by efficient methods of control inherent in the processes; by the intrinsic nature of the operations, and by the recognition of management in this industry of the importance of good housekeeping in minimizing atmospheric dust concentrations. Exposures to hydrogen fluoride gas released in etching of quartz surfaces and x-ray radiation used in testing of crystals were found to be adequately controlled in the usual manner.

—From "Health Hazards in Manufacture of Quartz Crystals used in Radio Communications," by BENJAMIN FEINER and SAMUEL MOSKOWITZ, in New York State Labor Department's *Industrial Bulletin*, March, 1944.

Cafeteria Survey

IN COOPERATION with the Maryland Committee on Nutrition and many Federal organizations, a survey of cafeterias located in industrial plants is now being conducted by the City Health Department in conjunction with routine inspectional activities. This survey is being made primarily to determine the sanitation of these cafeterias and also to study the types of foods served in relation to their nutritive values. Similar surveys have been made by the Federal agencies in other communities and it is thought that such studies will lead to awareness by industrial managers of the value of cafeterias to employees in the possible prevention of excessive absenteeism and in increasing the efficiency of workers.

—*Baltimore Health News*, April, 1944.

The Industrial Worker and the "Basic Breakfast Pattern"

In a recent country-wide study of eating habits by Elmo Roper, a national authority in such matters, an all-too-high percentage of industrial workers were shown to begin the day's work on an inadequate breakfast. To the industrial physician these findings, in many instances, will explain the frequently encountered mid-morning fatigue, lessened acuity, and lessened "application" to the work in hand. The greater the caloric energy output demanded of the worker, the sooner and more pronounced the lag in work performance.

Outstanding nutritionists and medical authorities, not only for greater efficiency but also and mainly for better nutritional health, recommend that breakfast provide from ¼ to ⅓ of the day's total food intake. A recommended "basic breakfast pattern" (600 calories) consists of fruit, cereal, milk, bread, and butter. This morning meal is easily brought to higher caloric levels by the addition of other suitable foods.

The contribution which the suggested dish of cereal makes is shown in the appended table. When 1 ounce of cereal (whole-grain, enriched, or restored to whole-grain values of thiamine, niacin, and iron) is eaten with 4 ounces of whole milk and 1 teaspoonful of sugar, this palatable dish contributes notable amounts not only of the primary nutrients but of important vitamins and minerals as well. The values given for cereal and milk are composite averages.

Calories	205
Protein	7.00 Gm.
Carbohydrate	33.00 Gm.
Fat	5.00 Gm.
Thiamine	0.18 mg.
Riboflavin	0.30 mg.
Niacin	0.84 mg.
Calcium	0.16 Gm.
Iron	1.29 mg.

The presence of this seal indicates that all nutritional statements in this advertisement have been found acceptable by the Council on Foods and Nutrition of the American Medical Association.

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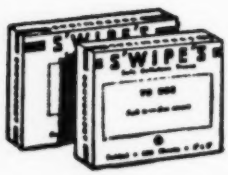
Cellulose Wipes

In Boxes . . . In Bulk



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Folded sizes, Bulk Packing: 4 x 6", 5 x 6", 6 x 6" and 5 x 9".

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Folded sizes, Boxed: 4 x 6", 5 x 6", 5 x 9". Various packings as to sheets per box and boxes per carton.

Your Dealer can give you details or write us for price list showing Dealer's List prices.

Due to conditions beyond our control, we are not always in position to supply all items shown on our price lists or advertised herein.

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GARWOOD, NEW JERSEY

Member, American Surgical Trade Assn., Hospital Industries Assn. and Nat'l Assn. of Mfrs

Industrial Nursing Education

INDUSTRIAL NURSING is being developed in the factories of the Triple Cities area of Binghamton, Johnson City, and Endicott as a result, in part, of a program of education made possible through the cooperation of management, directors of medical services and nurses of industrial plants, and nursing personnel of the State Departments of Labor and Health. The Triple Cities area and adjoining territory are old industrially. New plants and the conversion of old ones to war production have attracted much new labor involving many health problems. For 20 years or more, several of the older establishments have had industrial hygiene policies and procedures for medical service including nursing. The new plants employed industrial nurses who asked for help in organizing their programs. In 1941 there were 28 nurses employed by industry in this area. In 1943 there were 61. Practically all of the 33 recently employed left private or general duty for plant nursing. The Binghamton district nursing staff, after visiting each plant nurse, recognized the need for staff education in industrial nursing. Sixty per cent of the plant nurses expressed interest in a formal course in this subject. The Director of Syracuse University's off-campus Extension School in Endicott was interviewed as to the possibility of organizing such a course and he in turn consulted with the University's Director of Public Health Nursing who later advised that instruction would be offered if 15 registered. Each nurse in the district was then asked whether she would be interested in taking a course which would offer two college credits and cost $26.00. Thirty-six responded in the affirmative. Eight had been in industrial nursing from 10 to 20 years and wanted further instruction. Five school-nurse teachers, three nurses from physicians' offices, one private duty nurse and three hospital staff nurses also enrolled. Under arrangements made through the Director of the Endicott Johnson Medical Unit, classes were held in the lecture rooms of Wilson Memorial Hospital, Johnson City. The practical results of this have already become apparent. Standing orders, and special eye and treatment trays have been provided and are in use. Health education, formerly an urgent plant need, has become more evident through the use of posters and conferences with employees during visits to the first aid room. Four of the newer industrial nurses have matriculated for further college work at Syracuse University. Three requests for repetition of the course have been received by the Binghamton district office and four nurses who were enrolled have expressed a wish for other college instruction which they would like offered in the Triple Cities area.

—NETTIE B. BUBB, in New York Department of Labor's *Health News*, January 24, 1944.

Nation's Health

NO BETTER indication of the splendid manner in which the civilian doctors are carrying their wartime burden, is to be found than in the excellent state of the nation's health. This is a tribute to our civilian doctors. It reflects their response to the abnormal, wartime demands made upon them. It also indicates that the number of doctors in itself is not the sole factor that influences the health of a nation. We have been singularly free of epidemics, despite the current physician shortage. If certain diseases were to become epidemic in various areas of the United States we would undoubtedly face a severe problem. The truth of the matter is that the adequacy of medical care depends more on the relative demand for the services of physicians than on the relative supply of physicians. As the U. S. Public Health Service pointed out, following a survey of the patient load, "1,000 persons in one area may demand twice as much service as 1,000 in another area." The solution of this problem does not rest entirely with the doctors. They can only do as they have done: work harder, longer, spread themselves thinner and cooperate among themselves to make a maximum efficient use of professional talents in the public interest. The civilians must then do their share, too. Thus, (1) phone the doctor and tell him as clearly as you can what is wrong. Let him decide whether he should come to see you or you should go to him. (2) Go to him whenever you are able, as house visits take time when someone else may need him urgently. (3) Keep your appointment promptly and make it at the doctor's con-

a complete unit for approved contraceptive technique

provides for patient comparison of Jelly and Cream (no extra cost)

The Koromex Set Complete contains in a handsome case:

Koromex Diaphragm with special pouch

Koromex Trip Release Introducer (takes all size diaphragms)

Tube Koromex Jelly (higher lubricating factor)

Tube Koromex Cream (lower lubricating factor) formerly H R Emulsion Cream

Set Dickinson-Freret Fitting Charts

Price of Koromex Set Complete is only that of the Koromex Diaphragm and Koromex Trip Release Introducer. Attractively packaged with removable label. To prescribe, just write "Koromex Set Complete" and state size of diaphragm. **Write for literature.**

Holland-Rantos *Company, Inc.*

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Decisive 4 WAY ACTION IN ARTHRITIS

Prescribed with increasing frequency in arthritic cases, Occy-Crystine serves four important therapeutic objectives . . . .

1 It quickly relieves colonic stasis by catharsis,

2 It markedly improves liver and gallbladder function,

3 It stimulates renal clearance of toxins by diuresis, and

4 It releases colloidal sulfur, so frequently deficient in the arthritic economy. *Try it in your next case!*

Formula: Occy-Crystine is a hypertonic solution of pH 8.4, made up of the following active ingredients — sodium thiosulfate and magnesium sulfate, to which the sulfates of potassium and calcium are added in small amounts, contributing to the maintenance of solubility.

Trial supply and full data gladly sent on request to

OCCY-CRYSTINE LABORATORY
SALISBURY, CONNECTICUT

OCCY-CRYSTINE
the sulfur-bearing saline *detoxicant-eliminant*

MAY WE HELP YOU?

Personnel problems are paramount today, and busy industrial employers will find that in utilizing the services of our Bureau they can secure competent assistance in contacting dependable medical and nursing personnel. Our list contains many well qualified applicants, some with several years of successful industrial experience, who are available for appointments. Our service is dedicated to expediting negotiations between employer and employee.

We invite anyone who is seeking an appointment in industrial medicine, nursing, or clinical laboratory or x-ray to consult us concerning ambitions and requirements. It is quite likely that the long sought after opportunity may be listed in our files now. If not, we can assure you of an earnest effort on our part to find it.

Aznoe's-Woodward Medical Personnel Bureau
Ann Ridley Woodward, Director
30 North Michigan, Suite 607-I,
Chicago 2, Illinois

venience, so that he can plan his hours more efficiently. (4) Follow the doctor's advice to the letter so that your trouble doesn't drag on, get complicated or need extra attention. Merely by heeding these four simple rules the civilian population will go a long way to alleviate the burden of physicians in this country, a worthy public service in this wartime emergency.

—From "Information on The Shortage of Physicians in the United States," prepared and distributed by Wyeth Incorporated.

CURRENT ARTICLES of QUALITY

For the Smaller Industry

RUTH F. WHEELER, R.N., Director, Waltham District Nursing Association, "Waltham's Employee Health Plan for Smaller Industries," in *Industry* (Associated Industries of Massachusetts) April, 1944 (9:7, 37-39). Extract: " Experience of the Waltham Screw Company: 'At the outset of World War II, Waltham Screw Company was called upon to increase its personnel from 70 to 250 people. The management, realizing that every moment's production was critical, felt that satisfactory medical examination of personnel and correction of faults should be a basic requirement for continued production. Therefore, a policy was adopted whereby each employee would receive a post-employment complete physical examination, including chest x-ray, blood test and urinalysis, using the facilities of the Waltham Hospital through special arrangement. As a follow-up of the examination, reports were made by our doctor and members of the hospital staff, together with the Waltham District Nursing Association. This Association was asked to contact our organization two days a week for a two-hour period. In the period between July, 1943, and January, 1944, inclusive, 30 cases were referred to the oculist, 60 cases to the dentist, 119 to family physicians, 13 to the nutritionist, and four to the ear specialist. This covered visits with a plant personnel of 250 people, twice a week. 218 new cases were handled, and 334 old cases were visited or treated. As all business must be run with the principle of profits gained as a *raison d'etre*, the company has been interested in testing its belief in adopting progressive medical ideas concerning personnel relations. We believe on account of increased production, lower percentage of rejections of our product and better health throughout the plant (and this includes a lower rate of absenteeism) that this plan has been successful. We wish to commend the Waltham District Nursing Association, the Waltham Hospital and our plant physician, for achieving these excellent results at the Waltham Screw Company.' Experience of Bird & Company.: 'Being a small but growing organization, it was scarcely practicable to employ a regular nurse; or even a full-time, trained attendant. However, we were fortunate in finding among our operators one who had formerly had experience in a large hospital. We set aside a part of our factory as a first-aid room, and equipped it to meet emergencies as they arose. This set-up worked very well in minor cases such as cuts, bruises, burns, or slight illnesses which happened during working hours and which our operator could handle very well. We found, however, that many personal ailments, some of which were causing absenteeism, would not be reported to the attendant, due to embarrassment or some other reason. We felt it necessary to call in some outside agency to clear up this condition. This we did about a year ago when we placed our problem in the hands of the Waltham District Nursing Association. This experiment proved very successful from the start. The employees readily told their story to the nurse in charge, and they were advised, in many cases, where to go and whom to see to correct their ailments. Many of our operators are in much better physical condition today as a result of the splendid efforts of the nurse in charge. Having obtained standing orders from the factory physician, first-aid treatment has been provided at the times when the nurse has been pres-

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Applied topically to minor skin injuries, irritations or infections, Campho-Phenique offers a direct analgesic, antiseptic and antipruritic action.

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LITTLE LAMBS EAT IVY

(But your patients can't)

Relief from poison ivy and poison oak dermatitis afforded by ***RHUS TOX ANTIGEN****, a specific for prevention and treatment.*

RHUS DERMATITIS is a laughing and singing matter only for the non-susceptible. Physicians—and susceptible persons—know how distressing and annoying it can be.

With greater portions of the populace spending much of their time out-of-doors, in potential contact with poison ivy or poison oak, the medical profession is more actively interested in the prevention and treatment of this major nuisance than ever before.

Happily, most persons susceptible to rhus dermatitis may be successfully desensitized by preseasonal prophylactic injections of RHUS TOX ANTIGEN. Furthermore, relief of the distressing symptoms of the dermatitis itself may be obtained by specific treatment with RHUS TOX ANTIGEN—sometimes within 24 to 48 hours after the first injection.

RHUS TOX ANTIGEN is the original poison ivy antigen for specific treatment and desensitization in rhus dermatitis. An aqueous-alcoholic solution, it is quickly absorbed, assuring prompt results. It is oil-free, thus minimizing the possibility of pain as well as nodule formation and tumefaction.

RHUS TOX ANTIGEN may be used for treatment and prophylaxis of the dermatitis produced by poison ivy, poison oak, or poison sumac, as the irritating oleoresins of these three plants are similar or identical. RHUS VENENATA ANTIGEN is available, if desired, for the specific treatment of the dermatitis due to poison oak or sumac.

For *Prophylaxis:* Two or four weekly injections RHUS TOX ANTIGEN, depending on degree of sensitivity.

For *Treatment:* Initial dose ½ to 1 cc. deep intramuscularly; thereafter 1 cc. every 12 to 24 hours until dermatitis is under control.

Both RHUS TOX ANTIGEN and RHUS VENENATA ANTIGEN are supplied in packages containing four 1 cc. ampul vials. The National Drug Company, Dept. G, Phila. 44, Pa.

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Rhus Tox Antigen

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Only an Outstanding Contribution Could Gain Such Sweeping Recognition

That Decholin initiated a new era in the treatment of biliary tract disorders, and that it greatly widened the knowledge of biliary tree physiology and pathology, is attested by more than 400 reports concerned with its pharmacodynamics and by its inclusion in a large number of textbooks and monographs.

Decholin, an original research development, is chemically pure dehydrocholic (triketocholanic) acid, an oxidation product of cholic acid. It is so low in toxicity that it may be given in adequate dosage, by mouth or intravenously (in the form of Decholin sodium).

The action of Decholin is exerted specifically upon the hepato-biliary apparatus. It increases biliary flow as much as 200%, resulting in a copious outpouring of thin, free-flowing secretion — true hydrocholeresis.

This thin liver-bile, secreted under increased pressure produced by Decholin, washes before it inspissated accumulations, promotes better drainage, lessens absorption of possible metabolites of infection.

This desirable pharmacologic behavior makes Decholin of established value in the management of chronic cholecystitis, noncalculous cholangitis, biliary dyskinesia, and pre- and postoperatively in gallbladder surgery. Decholin is contraindicated only in complete obstruction of the common or hepatic bile duct.

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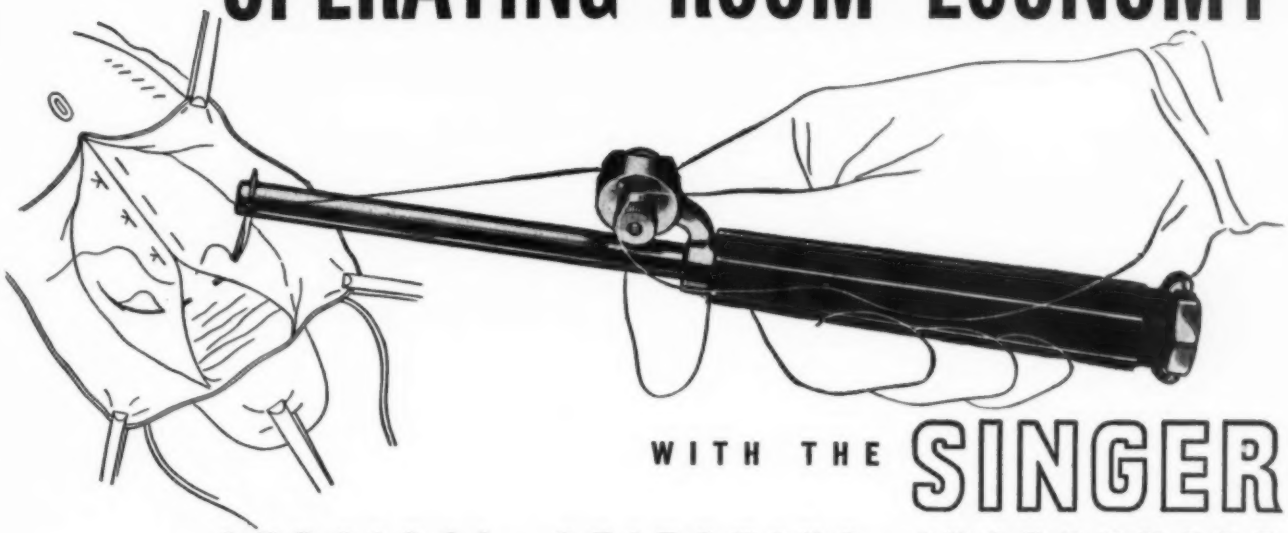
PACE-MAKER OF BILE ACID THERAPY

ent. One of our employees who had been absent on an average of two or three days a week with a secondary anemia, was advised by the nurse to put herself under medical care. Her doctor advised liver injections, and it was arranged that the nurse give the treatment when she visited the plant. The employee is now able to do a full-time job and her general and mental condition have improved remarkably. We have the nurse visit our factory three days a week at a very nominal fee, and she keeps in close contact with all our employees, not only in the shop, but also advising them in many cases about the home and outside problems. It is our honest opinion that the aid we have received from the visiting nurses has materially reduced absenteeism, and has helped to keep the health and the morale of our organization at a very high level.'"

Selecting the Nurse

STATEMENT prepared by the Executive Committee of the Industrial Nursing Section of the NOPHN, intended as a temporary guide to management in the selection of a nurse and not as a description of minimum qualifications, in *Public Health Nursing*, April, 1944: "Industry needs the open-minded, competent nurse who is not afraid of work, obstacles or people and this is a field where both men and women who meet professional requirements have equal opportunity for broad usefulness. The professional preparation beyond graduation from an accredited school of nursing and registration in the state of employment depends on the position in the industrial health service for, just as in the hospital or public health organization, there is a range in positions from junior staff nurse to head of the department. The nurse recently graduated from a school of nursing can give useful service in any industry where she is working under direct and competent nursing supervision. It is recognized that the inexperienced nurse is not prepared to develop a health service where none previously existed nor to carry responsibility for a department where she is the only full-time health worker. Industrial medical practice is not solely the treatment of occupational disabilities. A sizeable financial stake is involved in absenteeism due to non-occupational illness, as well as in workmen's compensation and—directly or indirectly—the employer, the employee, and the community all pay their share of this cost. Accident prevention and health education have long been stressed and industrial medical practice is looking toward a postwar expansion of service in which keeping the worker well will have main emphasis. Because industrial nursing is a specialized branch of nursing, it is recommended that a nurse entering the field of industry have additional preparation after graduation from an accredited school of nursing. This preparation is being made available in many universities offering courses in public health nursing especially to prepare nurses who wish to enter the industrial field. The nurse needs to have a working knowledge of industrial hygiene, workmen's compensation, accident prevention and safety promotion, plant sanitation, industrial welfare activities and personnel administration, nutrition, communicable disease control and mental hygiene. She needs to be acquainted with community health policies and resources, public health and industrial hygiene organizations—local, state, Federal and national. Experience in the field of generalized nursing is valuable. Practical knowledge, such as that gained by working in an out-patient department, for instance, or within a visiting nurse service or health department, is an asset. For the newly-appointed industrial nurse, the planned period of orientation in her own plant should include the opportunity to visit other well-established industrial health services. Whether her program provides service to the employee in the plant only or is extended to him in his home, the nurse's ability to use and cooperate with community health organizations is of inestimable value to the employer and employee. Certain personal qualifications contribute to the effectiveness of the nurse in industry. These include the ability to work with people and to contribute toward good working relationships,

SAFER OPERATING ROOM ECONOMY



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In advising an operation, the surgeon's sole consideration is the restoration of his patient's health. However, the institution in which the surgery is performed faces certain inescapable economic factors, particularly under present war conditions.

Among the sounder means of achieving economies in the surgical department, with —not less—but *more* consideration for the patient, is the routine use of the Singer Surgical Stitching Instrument.

By replacing numerous individually threaded needles with a single instrument possessing suturing capacity usually sufficient for use in the average operation, nurses can be released from elaborate sterilizing, threading and clamping preparations. And since the surgeon carries the instrument in his own hand constantly while suturing proceeds, attendance of assistants at the operating table may be safely reduced — thus aiding a depleted personnel to carry on with increased efficiency.

This new surgical instrument saves in material costs as well: It uses up considerably less suturing material, and employs a needle that lasts indefinitely. Any standard suture material may be employed, or any needle from a wide variety of available sizes, shapes, or styles—for use in either a deep or superficial field.

The instrument is sterilized as a complete unit, and may be readily taken apart for cleaning, and reassembled. All parts are rust-resistant.

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Motion pictures demonstrating operative technique also available for group meetings.

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Personal demonstration available at your local Singer Shop

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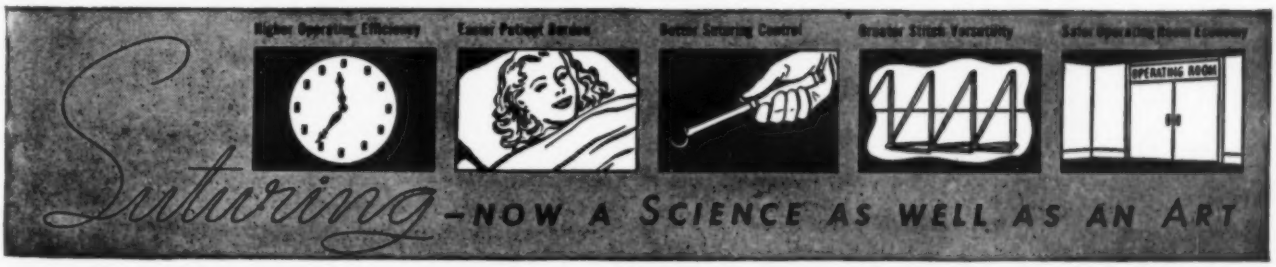

professional dignity, emotional stability, tolerance, initiative, skill in teaching, and the ability to act wisely in an emergency. For the nurse working alone, foresight, ability to organize her service, and resourcefulness are also essential. The supervising nurse must have qualities of leadership, executive ability, special aptitude for teaching, and vision as to the potentialities of the service. As in other professional fields, nurses in industry will be interested in maintaining membership in their local, state and national nursing organizations in order to keep their own professional standards high and to contribute to the sound development of professional nursing. Often the nurse is the only full-time health worker in an industrial service; the scope of her work is broad and the results of her decisions have far-reaching implications in compensation costs and in employee relations. In a competitive system where the cost of accidents and illness is inevitably added to the cost of production, the health service is an asset or it is a liability added to a liability. Therefore, thorough preparation for her work is the responsibility of the nurse. Discriminating selection of the nurse for the position is the responsibility of management."

Rehabilitation

DR. CARL M. PETERSON, Secretary, A.M.A. Council on Industrial Health, "War Casualties and Industrial Rehabilitation," in *Mississippi Valley Med. J.*, April, 1944 (66:2, 56-57). Extract: "Medically speaking, the functions of the physician in rehabilitation consist of the following: (1) Physical examination. (2) Accurate estimation of disability. (3) Suitable medical and surgical management. (4) Placement in suitable occupation. (5) Periodic reexamination and readjustment. There are, to be sure, other factors to be considered in the rehabilitation of an individual but for physicians at large these will be the main considerations. There is opportunity here to discuss only briefly placement of the disabled in employment. This step is not so simple as it sounds, but fortunately the status of the labor market in very recent years has given physicians in industry an extensive experience in this direction. To be successful in this kind of program the physician in charge must be in position to make an accurate estimation of physical abilities and to match them with individual job requirements. Most physicians have seldom taken the trouble to acquaint themselves with essential demands of specific occupations but they must do so to be as helpful as possible to the veteran. Once this effort has been made, a great many practitioners will be astounded at the kinds of employment which can be satisfactorily filled by the lame, the halt, the blind and the hard-of-hearing. A number of very interesting methods have been devised for fitting the square pegs into square holes by such agencies as the U. S. Civil Service Commission, the War Manpower Commission, by many a large industry and by casualty insurance organizations. All of these methods are now under study by the Council on Industrial Health and will be brought to the attention of the profession at large in due course. The Council on Physical Therapy and the Council on Industrial Health have appointed a Joint Committee on Rehabilitation. Among other objectives it is the intention of this Committee to undertake an educational program designed to bring to the practicing profession a real understanding of the size and nature of the rehabilitation problem. The educational facilities of local, state and other medical societies will be used wherever possible. There is much to be done, especially to assure full local participation in this gigantic program. The disabled deserve our best consideration, not merely from a sense of obligation but because in competition with their normal brethren they pile up better records in attendance at work, in decreased accident occurrence and in the quality and quantity of production. Physicians, therefore, should recognize rehabilitation as a pressing medical issue and should put themselves in position to search these disabled individuals out, to assure competent treatment, and to adjust them in suitable occupations at the earliest possible time."

Physical Capacities

DR. CLIFFORD KUH, "Physical Demands and Capacities Analysis," in *Permanente Foundation Medical Bulletin*, March, 1944 (2:2, 68-73).

Rx DESITIN OINTMENT

The External Cod-Liver Oil Therapy

USED EFFECTIVELY IN THE TREATMENT OF

Wounds, Burns, Ulcers, especially of the Leg, Intertrigo, Eczema, Tropical Ulcer, also in the Care of Infants

Desitin Ointment contains Cod-Liver Oil, Zinc Oxide, Petrolatum, Lanum and Talcum. The Cod-Liver Oil, subjected to a special treatment which produces *stabilization* of the Vitamins A and D and of the unsaturated fatty acids, forms the active constituent of the Desitin Preparations. The first among cod-liver oil products to possess unlimited keeping qualities, Desitin, in its various combinations, has rapidly gained prominence in all parts of the globe.

Desitin Ointment is absolutely non-irritant; it acts as an antiphlogistic, allays pain and itching; it stimulates granulation, favors epithelialisation and smooth cicatrisation. Under a Desitin dressing, necrotic tissue is quickly cast off; the dressing does not adhere to the wound and may therefore be changed without causing pain and without interfering with granulations already formed; it is not liquefied by the heat of the body nor in any way decomposed by wound secretions, urine, exudation or excrements.

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Indications: Minor Burns, Exanthema, Dermatitis, Care of Infants, Care of the Feet, Massage and Sport purposes.

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PENICILLIN
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A RECORD OF PERFORMANCE

THOROUGHGOING experience and established leadership in organic research, development, and production have been the determining factors in the rapid achievement of large-scale Penicillin production by Merck & Co., Inc.

Intensive research on Penicillin, begun in the autumn of 1940, established a sound basis for the successful development of mass production. By applying chemical engineering principles to the manufacture of this intrinsically unstable and difficultly produced substance, Merck & Co., Inc. succeeded in devising and perfecting a practical method of production, based on the mass-fermentation principle.

The following chronologic review tabulates the more important advances leading to the present volume of Penicillin production, including some of the contributions that we have been privileged to make:

1929—Penicillin discovered by Fleming in England.

1932—First report by British investigators confirming original work on Penicillin.

1940—First isolation of solid Penicillin by Oxford investigators.

1940—Merck research on antibiotics concentrated on Penicillin.

1941—First report of Penicillin's clinical value.

1941—Prof. H. W. Florey and Dr. N. G. Heatley, of the Oxford group, visited the United States to confer with interested Government officials and manufacturers, with the objective of establishing Penicillin production in America.

1941—Dr. Heatley, who participated in the first production work in England, remained at the Merck Research Laboratories to collaborate with Merck chemists in developing test and production procedures.

1941—Merck brought about a reciprocal arrangement between British and American investigators to spur production in cooperation with the United States and British governments.

1942—Merck supplied Penicillin for first case of bacteriemia successfully treated with Penicillin in America.

1942—Merck Penicillin was rushed under police escort to Boston for treatment of the Cocoanut Grove fire casualties.

1943—Merck sent supplies of Penicillin to England by air transport for urgent therapeutic use by the United States Army Medical Corps.

1943—Large-scale production of Penicillin was established by Merck to meet Government requirements.

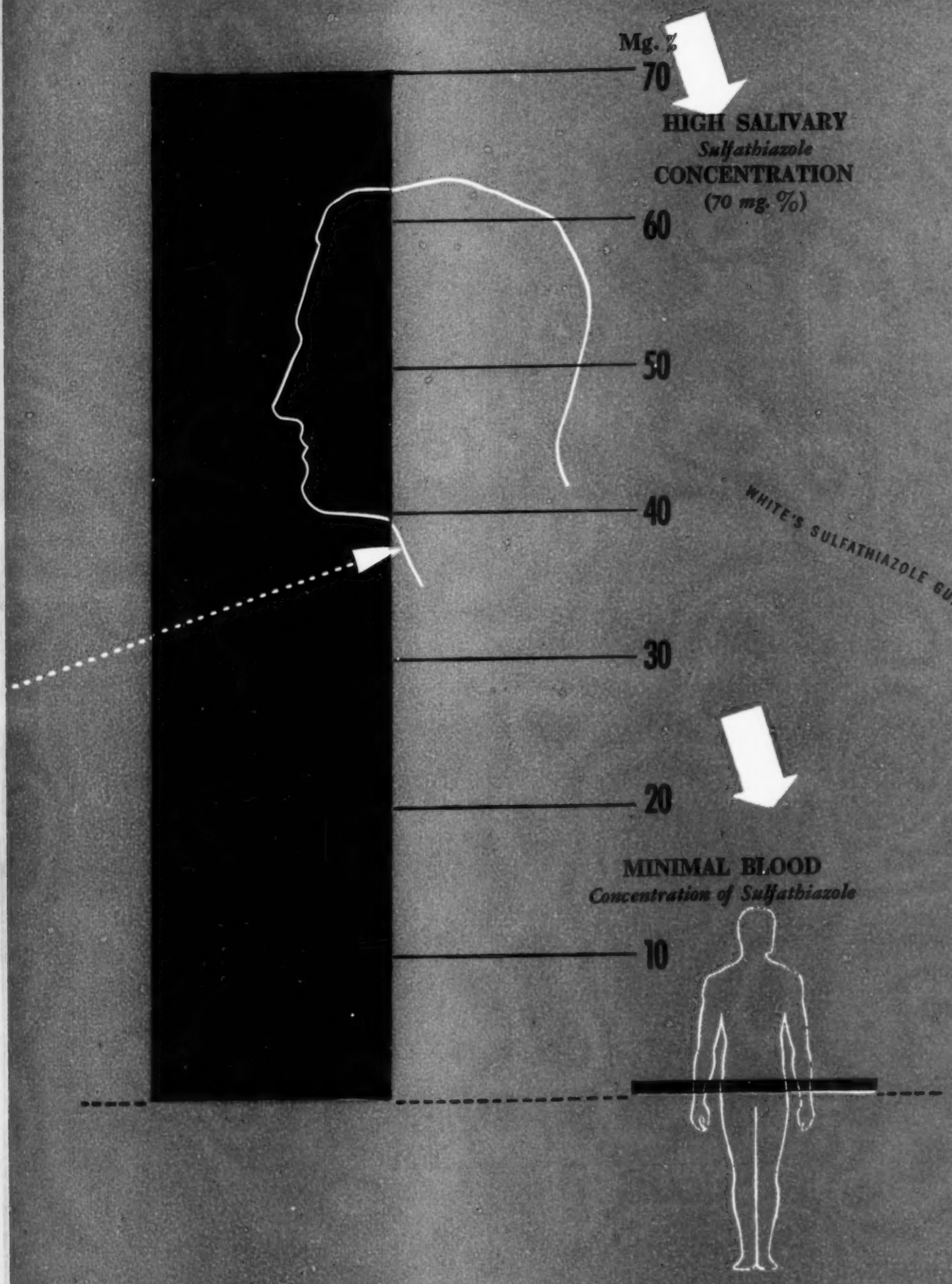
1944—Merck sends ever-increasing supplies of Penicillin to our Armed Forces.

Merck & Co., Inc. will continue to surpass present production records, with the urgent objective of supplying adequate quantities of Penicillin for civilian use, as soon as the essential requirements of our Armed Forces have been fulfilled.

MERCK & CO., Inc. *Manufacturing Chemists* RAHWAY, N. J.

In Canada: Merck & Co., Ltd., Montreal and Toronto

An illustrated booklet describing the clinical uses of Penicillin Merck is available on request.



WHITE'S SULFATHIAZOLE GUM WHITE'S

Throat Chemotherapy without Systemic Toxicity

White's Sulfathiazole Gum provides a high and very *prolonged* salivary concentration of *locally active* sulfathiazole throughout the whole oropharyngeal area—with almost negligible elevation of the blood level.

One tablet, chewed for one-half to one hour, promptly initiates a high salivary concentration of dissolved sulfathiazole—and *maintains* throughout a full hour's chewing period, an average concentration of 70 mg. per cent.

Yet even with *maximal* dosage, and even in children, resultant blood levels are not even quantitatively measurable for the most part and at no time exceed 1 mg. per cent. Freedom from the likelihood of systemic toxicity is obvious.

Valuable in the treatment of such conditions as septic sore throat, peritonsillitis, pharyngitis, tonsillitis, infectious gingivitis. Widely and successfully prescribed—ethically promoted, of course.

White's Sulfathiazole Gum is supplied in packages of 24 sanitaped tablets, in slip-sleeve prescription boxes—on prescription only. White Laboratories, Inc., Pharmaceutical Manufacturers, Newark 7, N. J.

WHITE'S SULFATHIAZOLE GUM WHITE'S SULFATHIAZOLE GUM

White's

SULFATHIAZOLE GUM

"FOR THE COUNTLESS MINOR BURNS OF FACTORY AND HOME..."

THE *enormous frequency of minor burns* makes them as important in the sum total of human suffering as the relatively infrequent critical third-degree burns.

You will find UNGUENTINE a valued aid in the common minor burns of daily practice, because:

1. ***Unguentine is analgesic.*** For prompt relief of pain.
2. ***Unguentine is antiseptic.*** It fights infection with sustained contact and action.
3. ***Unguentine promotes healing.*** It aids regeneration, usually without scar formation.

FOR FREE SAMPLE of UNGUENTINE for professional and personal use, write—THE NORWICH PHARMACAL COMPANY, Norwich, New York.

Norwich*

*Reg. U. S. Pat. Off.

Extract: "It must be clear that the translation of clinical data into physical capacities presents many problems. No claim is advanced beyond the fact that a start has been made. For example, there may never be a categorical answer to the question of how much lifting should be allowed a specific individual with rheumatic heart disease, grade II. It has been said that the physician's judgment in each individual case may be the only criterion. Up to the present, in the placement of the shipyard workers, the one question which has been constantly asked is: Does the worker's job aggravate his physical condition? If so, then he should be advised not to continue on his present job and, if possible, should be changed to another. In the placement of cardiacs, four available criteria have been predominantly utilized to guide the physicians at the Permanente Foundation Hospitals: the electrocardiogram, 2-meter roentgenogram for heart size, physical examination of the heart, and history of previous activity. How much has the patient lifted in the past? If he is robust and has been accustomed to lifting 200 pounds without great effort, then he should be allowed to lift more now than a white collar worker with the same diagnosis. Possibly only by adopting arbitrary standards and then analyzing statistically the results of selective placement after intervals of time, can we hope to develop effective ways of translating clinical criteria into physical capacities analysis. This is a subject for future research which it is hoped may be undertaken by the Permanente Foundation. The Permanente Foundation has already granted funds for the publication of the physical demands information on the shipyard jobs in order to expedite the release of this material by the War Manpower Commission."

Army Industrial Medicine

HAROLD R. HENNESSEY, Lieutenant Colonel, Medical Corps, Industrial Medical Officer, Ninth Service Command, Fort Douglas, Utah, "Industrial Medical Program of the Army," in *Rocky Mountain Med. J.*, November, 1943. Extract: "With regard to military occupational hygiene, the Army has found that occupational hazards of fumes, gases, and ducts are associated with our armored forces. To deal effectively with this new problem of warfare, there has been established a unit known as the Armored Force Medical Research laboratory which is devoted to maintaining and increasing the physical efficiency of the soldiers of the armored forces. This laboratory has also given consideration to problems of heating, ventilation, fatigue, clothing, nutrition. proper rations, and the important matter of water consumption of our armored force soldiers. In this connection, it should be emphasized that a most valuable service is being rendered by experts in determining what must be done to protect the health of our soldiers in this mechanized total war. In addition to this, an Army industrial hygiene laboratory has been established, the main functions of which are to study environmetal conditions in Army-operated plants, depots, and arsenals. In addition, valuable assistance is being rendered by the U. S. Public Health service and the various state and local industrial hygiene services. The work of these organizations has also been extended to Army-owned contractor-operated plants. Further, active liaison has been established with various Army departments such as the Ordnance Department, Chemical Warfare service, and the Air Force. The work of the above mentioned organizations is closely coordinated through the various service commands and the various Army departments and services. Central directing control is vested in the Occupational Hygiene Branch, Division of Preventive Medicine, Office of the Surgeon General, U. S. Army."

Carbon Tetrachloride

DR. GEO. F. FASTING, New Orleans, "New and Important Applications of Carbon Tetrachloride in Medical Therapy," in *New Orleans M. & S. J.*, April, 1944 (96:10, 439-445). Conclusions: "(1) Carbon tetrachloride alone is an efficacious drug in the treatment of dermatophytosis. Its effectiveness appears enhanced by incorporating appropriate volatile oils and metals in combination with an oleate. (2) Carbon tetrachloride is an efficacious remedy for the treatment of smaller heat burns. In combination with an appropriate local anesthetic, it profoundly modifies and hastens the process of healing. (3) A single application of carbon tetrachloride to eposed corium promptly arrests serum oozing without causing evident necrosis or coagulation. (4) Carbon tetrachloride applied promptly to severe small burns has

how to fight fatigue and heat-prostration

SUMMER's sultry sun plus the man-made heat of
coke-oven or blast-furnace cause workers to lose vital body-salt
through perspiration, often as much as 300 grains per man in a single day.
This loss causes muscle-cramps, excessive fatigue, heat-prostration, and gastro-intestinal upsets.
Sharp & Dohme's 'Thermotabs' Tablets Sodium Chloride and Dextrose are designed for
relieving hot-weather fatigue by replacement therapy.
'Thermotabs' Tablets have long been used in steel mills and other industries where high temperatures from within and without affect workers adversely. Supplied in bottles of 100 and 1,000 tablets as well as bulk. Each tablet contains Sodium Chloride 7 grains and Dextrose U. S. P. 3 grains.
Dosage: Five to ten 'Thermotabs' tablets daily, one at a time with a glass of water.

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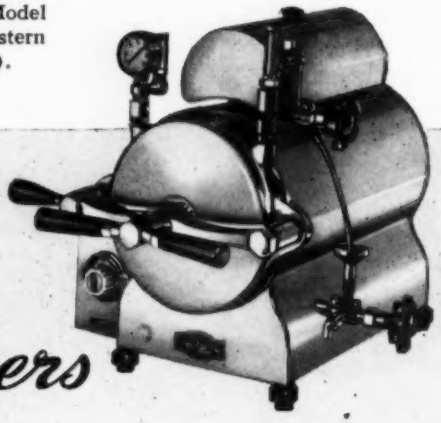
'THERMOTABS' *Tablets Sodium Chloride and Dextrose, S & D*

Now . . . Famous Model
HP 8" x 16" AUTOCLAVE has
"3-in-1" Master Control

Pelton pioneered the first automatic office Autoclave, bringing the safety of pressure sterilizing to thousands. Now Pelton has further perfected the famous Model HP Autoclave, with a fully developed control which combines on-and-off switch, pressure regulator and safety cutoff in one unit; a special variation of the device long used for automatic domestic oven control. Set it in advance to maintain any desired steam pressure, for gloves, instruments or dressings. Housed outside of the Autoclave body, away from high temperature. Now standard equipment on Model HP, listing at $245.00 (Eastern zone); $250.00 (Western zone).

New 3-in-1 Master Control has big, easy turning knob; and pilot light.

PELTON & CRANE COMPANY
Detroit 2, Michigan
Established 1900



PELTON Sterilizers

immediately relieved all pain, and prevented subsequent development of vesicles. (5) The accessibility of carbon tetrachloride in fire extinguishers makes possible an effective first-aid treatment in heat burns. (6) Under certain pathologic conditions, carbon tetrachloride exhibits properties of antiseptics and disinfectants. This property, which is shared by other fat solvents, deserves recognition in our theoretical concepts of disinfection and sterilization." From the discussion: "Data on 33 minor cases have been collected to date.* While they are not many, it is well to realize that even at a Charity Hospital this type of clinical material does not frequently present itself. It is hoped that the reading of the publication will produce an attitude favorable to testing extensively the principles involved. The remedy for burns suggested primarily as a first aid treatment in burns is admittedly an innovation. It is well to remember that no efficacious home remedy for burns is known. The student of medicine is inadequately being taught and impressed with the factor of time in relation to the display of biological phenomena. The absence of vesicle formation suggests the question: Does the prompt application of carbon tetrachloride to burns set in motion or arrest known and unknown physiologic powers? Small burns happen to one's self and one's immediate family often enough and should be observed more closely than hitherto has been the custom. A greater inquisitiveness about the control of forces involved in small burns may after all prove helpful to the problem of large burns. I like to hope that I have contributed in that direction. If humor is permissible here, allow a last suggestion. Place four or eight ounces of carbon tetrachloride in your bathroom cabinet. Try it for chigger bites after a summer day in the woods or fields. Assuming a fair percentage of physicians to be afflicted with 'athlete's foot'—try the remedy when an exacerbation of the ringworm is particularly annoying. The contents may prove useful as a fire extinguisher. It is the dry cleaning agent of choice for gravy spot on ties and vests. Above all make sure there is always some fluid left when accidents cause small burns to members of the family. (*Subsequent to the reading of this paper, before the Orleans Parish Medical Society, October 11, 1943, more than 100 burn cases have been treated in industrial plants. All cases have responded as previously described.)"

Cardiovascular Survey

DRS. PAUL M. RIKE and FRANK J. GREGG, Pittsburgh, "Cardiovascular Survey of Supervisors II," in *Pennsylvania Med. J.*, April, 1944 (47:7, 708-711). Conclusions: "In general, this study parallels that reported previously by W. L. Cook ("Cardiovascular Survey of Supervisors," INDUSTRIAL MEDICINE, July, 1942). The curves indicate that all abnormalities found showed a marked increase as the 40 year old age group was approached and a sharp rise beyond this point. On the whole, a comparison of tracings taken in 1942 with those taken in 1941 revealed very little, but in the cases where change was noted it was sufficiently significant to warrant such a comparison being made in the future. It might be added that electrocardiographic abnormalities, when severe, were for the most part accompanied by evidences of heart disease which were disclosed by the other methods of examination as well. There were but six cases in which a distinctly abnormal electrocardiogram was found as the only evidence of heart disease, an incidence of 0.6%. In spite of the figures to the contrary, we believe that the taking of a brief cardiac history is justifiable. We further feel that careful auscultation of the heart is necessary in such a survey and that systolic murmurs are worthy of note because in this series, at least, more than 50% were significant. A sharp drop was noted in the incidence of hypertension as the oldest group was approached, and this can possibly be explained by two factors; this was a small group numerically, containing only six men, and we be-

Millions applaud a *fighting* champion

PLY
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An emollient. Containg synthetic resin, vegetable gum, ultra violatum in vanishing cream base.
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IN conditions which require Moist Heat applications —but no specialized nursing care — an Antiphlogistine poultice is indicated.

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The comforting Moist Heat of an Antiphlogistine pack is effective in relieving the pain, swelling, and muscle spasms due to sprains, strains and contusions.

It is likewise effective in affections of the respiratory system; in relieving the cough, soreness, tightness of the chest, muscular and pleuritic pain.

Antiphlogistine may be used with chemo-therapy.

Antiphlogistine

Formula: Chemically pure Glycerine 45.000%, Iodine 0.01%, Boric Acid 0.1%, Salicylic Acid 0.02%, Oil of Wintergreen 0.002%, Oil of Peppermint 0.002%, Oil of Eucalyptus 0.002%, Kaolin Dehydrated 54.864%.

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lieve, as previously stated, that individuals showing marked hypertension probably do not survive to work in this advanced age group. The total number of abnormalities is difficult to determine from this study because so many of them overlap. An approximate incidence, however, is 21% of the entire series. This work is now being repeated yearly and it is hoped that sufficient information will be gathered to warrant future communications. The information derived from the first two reports has been largely of statistical importance. One of the objects of the study, i.e., the value of such examinations in detecting early signs of cardiovascular disease, cannot be evaluated at this time. We believe, however, that the detection of such diseases, previously unknown to the individual, will prove of distinct worth."

Trauma and Diabetes

DR. WILLIAM A. BISHOP, Massachusetts General Hospital, Boston, "Diabetes and Injury," in *J. Indust. Hyg. & Tox.*, 26:55, 1944. Extract from condensation in *Current Medical Digest*, March, 1944: "At present, when everyone who is able is urged to take part in producing the goods of war, many handicapped persons are being utilized. Under present conditions serious consideration must be given to the question of employment of diabetics in industry. Diabetics should be employed provided proper placement, control and supervision can be effected. Cooperation of the employee is the most important factor. Uncontrolled diabetics are a menace to themselves and others. There is great advantage in the fact that the cooperative diabetic is always readily available, so that close observation and control may be carried out. Since diabetes is caused by decreased function of the islands of Langerhans, the direct causation of the disease by trauma can take place only when the pancreas has been injured to an extraordinary degree. This occurs very rarely and death follows rapidly. Diabetes is not produced by shock or emotional strain except perhaps in exophthalmic goiter induced by severe emotional or psychic shock. The resultant increased metabolism may enhance an existing, or bring to light, a latent diabetes. Trauma to the head or nervous system may be accompanied by glycosuria but does not result in diabetes."

Silicosis from Wheat Dust

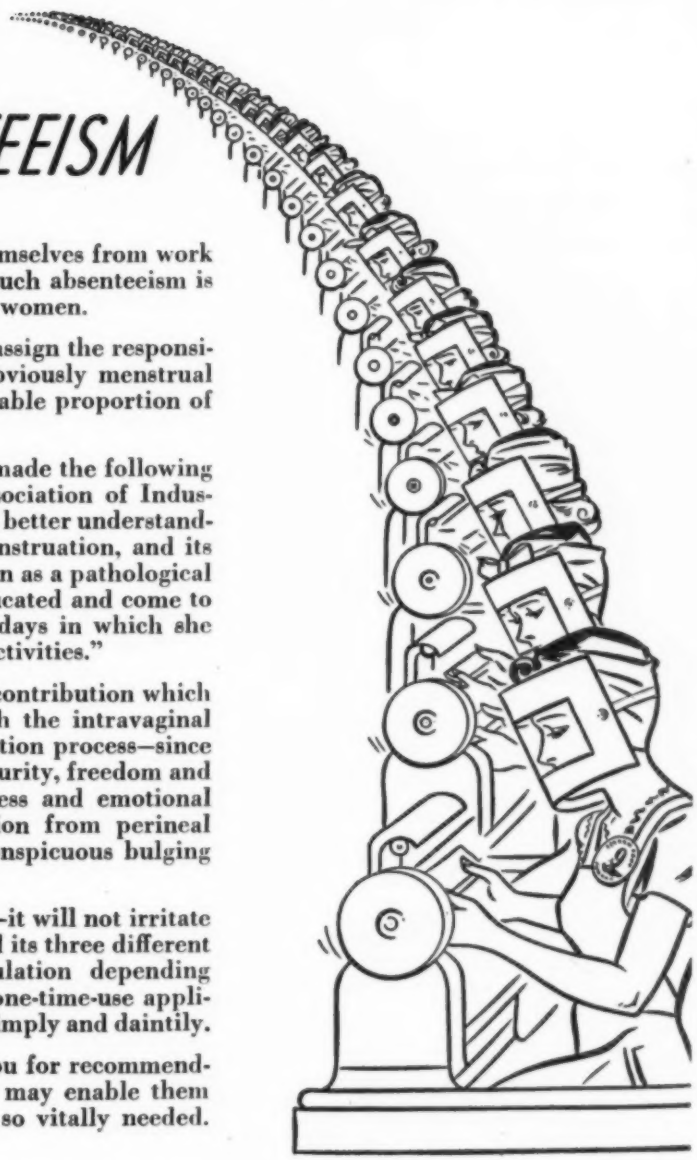
DRS. THOMAS F. HEATLEY, DALTON KAHN, and C. R. REX, Toledo, Ohio, "A Case of Silicosis caused by Wheat Dust," in *J.A.M.A.*, April 1, 1944 (124:14, 980-981). Summary: "A workman employed for eight years in an atmosphere thick with dust from wheat (loading and unloading railway cars) presented a roentgenogram typical of advanced silicosis without evidence of tuberculosis. Examination of the dust gathered at his working places showed that 20.25 and 31.55% of the particles were between 1 and 44 microns in size. The silica content of these particles was 19.96 and 9.96%. A second examination, made two years later, showed that the fibrotic process in the lungs had progressed, although there had been no further exposure to silica-containing dust. At present, January 11, 1944, he is completely incapacitated."

Industrial Hygiene Today

DR. J. G. TOWNSEND, Medical Director, Industrial Hygiene Division, U.S.P.H.S., "The Industrial Hygiene Program Today," in *New Orleans M. & S. J.*, March (96:9, 388-394). Presented at New Orleans Graduate Medical Assembly, 1943. Extract: "A glance at conditions in your State of Louisiana shows that this state has been predominantly an agricultural state. Yet it has a large shipbuilding industry and the number of Louisiana workers in this occupation increased from 1,300 in January, 1940, to 24,000 in 1942. Here also is the largest chemical plant in the South, the largest rice milling plant in the country, a large shell loading plant, a munitions depot and an ammonia plant. I understand a magnesium plant, a butadiene rubber plant, and an avia-

OBJECTIVE

REDUCTION OF FEMALE ABSENTEEISM



Statistics show that women absent themselves from work much more often than men; indeed, such absenteeism is said to be 50 per cent[1] higher among women.

Though available data do not clearly assign the responsibility for this marked differential, obviously menstrual inconveniences account for a considerable proportion of the days lost.

On this point Pommerenke[2] recently made the following observation before the American Association of Industrial Physicians and Surgeons: "With a better understanding of the purpose and nature of menstruation, and its recognition as physiological rather than as a pathological process, many a woman may be re-educated and come to regard the so-called difficult days as days in which she need not seriously curtail her usual activities."

Many physicians have discovered the contribution which *improved menstrual hygiene* (as with the intravaginal tampon Tampax) affords this reeducation process—since it provides such a welcome sense of security, freedom and poise by relieving the physical distress and emotional uncertainty caused by vulval irritation from perineal pads, or from olfactory offense, or conspicuous bulging under slacks or coveralls.

Tampax can be used easily and safely—it will not irritate delicate tissues nor block the flow. And its three different absorbencies permit individual regulation depending upon daily needs. Compressed into a one-time-use applicator, it may be inserted and removed simply and daintily.

Your patients should be grateful to you for recommending Tampax—and (in many cases) it may enable them to stay "on the job" where they are so vitally needed.

(1) Mod. Med., 11:130, 1943; (2) Ind. Med., 12:512, 1943

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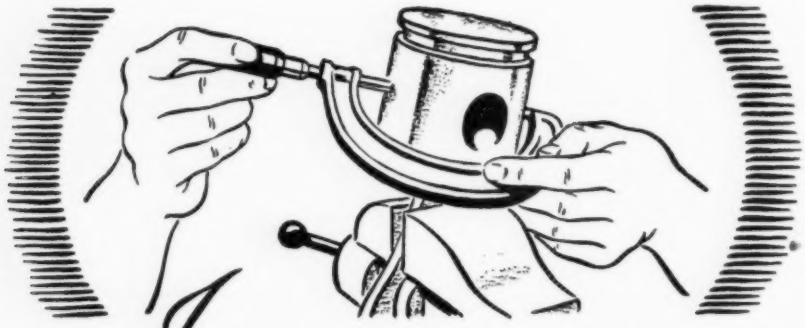

In OCCUPATIONAL DERMATITIS

. . . . HEMORRHOIDS . . . . PRURITUS

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tion gasoline refinery are under construction. It appears that your labor supply is adequate except for skilled workers. However, reports are that certain plants are experiencing high labor turnover occasioned by the employment of women, lack of housing facilities within convenient distance, lack of work experience, and by physical and health hazards in certain occupations, such as shell loading. May I suggest that these plants with special problems to solve make the utmost use of the excellent industrial hygiene unit Louisiana has. An industrial hygiene unit, as you may already know, includes medical, chemical, and engineering personnel, as well as consultant services on numerous health problems. When an industrial hygiene unit goes into any plant, it evaluates the potential hazards, analyzes the efficiency of existing health safeguards, and recommends necessary improvements. The chemist acquaints himself with the specific materials used in the plant. He determines which of the substances constitute potential or actual hazards to health. He is aware of the wide range of toxic exposures in manufacturing procedures. He knows that almost three million American workers are on jobs where organic dusts are potentially dangerous—jobs where by-products like carbon monoxide may reach dangerously high concentrations. He knows that three quarters of a million men work with lead and its compounds; a quarter million handle sulfur dioxide; a hundred thousand are exposed to chromium. In the meantime, the engineer has been examining ventilation, lighting, safety equipment, workbench space and mechanical fatigue hazards. He must also plan for mechanical control of toxic exposures. Armed with the facts and figures supplied by the chemist and engineer, the doctor checks the physical condition and clinical history of every worker in the plant. If there is a medical service in the plant, he works closely with the physician in charge. He advocates the pre-placement examination, regular examinations on the job, and careful maintenance of absentee records. The chemist, the engineer and the doctor pool their observations. The chemist may suggest chemical methods of control—substitution of non-toxic or less toxic materials for those in use. The engineer may suggest a better ventilation system. The doctor's job is perhaps more complex than his co-workers'. If the recommendations made by the chemist and engineer are not carried out or maintained at peak efficiency, the doctor is the first to note the storm signals as they appear in headaches, fatigue, stomach disorders, unexplained nervousness, and sudden drop in the blood count."

Visual Defects

HEDWIG S. KUHN, M.D., "Significance of Visual Defects in War Production Effort," in *The Sight-Saving Review*, Fall-Winter, 1943 (13:3, 180-186), reprinted from *J.A.M.A.*, December 25, 1943. Extract: "Physicians in general have an exceedingly important and a direct responsibility in the war production effort. This responsibility is twofold. First, they must walk boldly out of their 'ivory towers' and go directly to industry and offer their services. They must do this with an honest determination to be open minded and realistic. They must try not to let old stereotyped ways of doing things (even if these ways are good) interfere with their willingness to learn new ways, and quickly, if the occasion calls for them. This is a war, and it is their war. Management, labor, the farmer, the housewife and the 18 year old have learned new ways of doing things, and they have not always been pleasant ways. So too physicians need badly to loosen up their tight collar of hesitancies and worrisome fears and get to work on the problems that only they are trained to solve, even if the new but necessary ways are unpleasant. To illustrate, I shall take an actual example—one industry and one day's group of 35 applicants who had been found to have substandard visual acuity in their original screening tests. These 35 represent according to statistics the average number of defects in acuity found for about every hundred persons 'screened,' namely about 35%. The results of refraction were as follows: Of the 35, 18 who would otherwise have been left in class B were brought to normal with proper glasses and put

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ERTRON *50 capsules*	4.50	3.50
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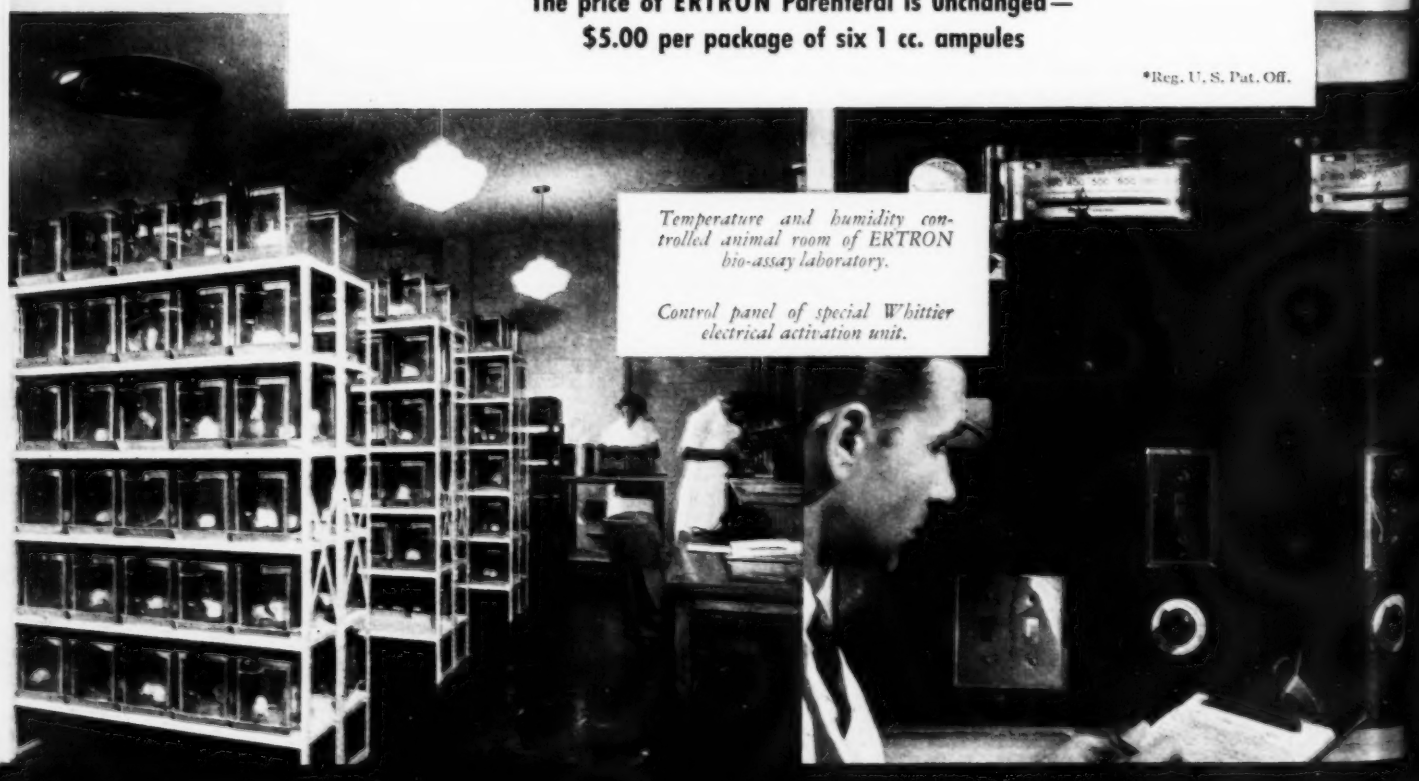

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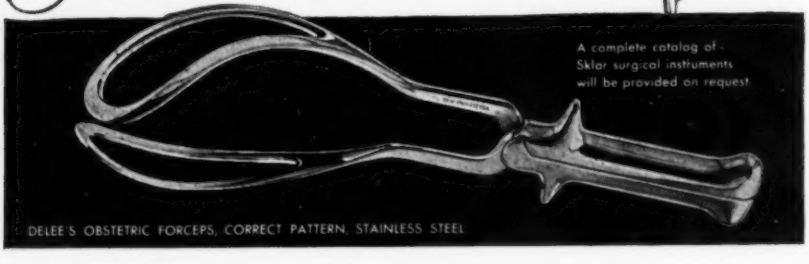

DELEE'S OBSTETRIC FORCEPS, CORRECT PATTERN, STAINLESS STEEL

into class A; 10 who would otherwise have been rejected conclusively were brought to normal with glasses and put into class A, and, seven were rejected because of disease (for example, optic nerve atrophy, cataract, macular hemorrhage and old perforating injury of the eye). In this particular war plant the visual standards had to be high because of the nature of the work—class A having 20/30 vision or better in both eyes. In terms of the war need, 28 of 35 applicants were salvaged immediately and put to work at class A jobs. Ten of these would undoubtedly have been lost entirely to this particular plant, at which they were applying, if they had simply been told to go get their eyes fixed. There are still too many jobs open where nobody bothers about whether or not the applicant sees well. Eighteen of these applicants would have been denied class A jobs, and management in this plant, needing top visually qualified workers most urgently, would not have been able to use these 18 men except as sweepers and janitors and in similar capacities. In this instance, of course, the ophthalmologist was working close to the day by day problems of the industry and was therefore actually responsible for equipping 28 of 35 men. This is the salvage figure for one day for one industry. Figured by the month, it means an average of 800 to 850 men and women given a chance to work by being equipped to meet the requirements. Such salvaging should occur day after day, month after month, in industry after industry, and it demonstrates how ophthalmologists can face their first responsibility by going forth to meet the needs of industry inside its gates."

Nursing Care of Eyes

ELEANOR W. MUMFORD, R.N., "Nursing Care of Eyes in Industry," in *The Sight-Saving Review*, Fall-Winter, 1943 (13:3, 165-173). Extract: "Nurses in industry are doing a real piece of sight saving. Many are finding eye problems with which they are not prepared to cope. Two things are important here. First, no nurse should be ashamed of being unable to meet the many problems she sees, but every nurse should be willing to turn to proper sources for help and know what those sources are. The National Society for the Prevention of Blindness offers consultation services to assist nurses in building up local resources. Secondly, the nurse should recognize that sight conservation in industry is a shared responsibility. She cannot do it alone. The more she gets involved in technical procedures for testing vision or conducting a safety glass program, the less time she will have for duties which are more urgently her responsibility—health supervision and the care of the sick and injured. Actually she may contribute more to sight conservation by doing these well than by assuming too much responsibility for technical aspects of eye protection and the detection of visual defects. This is particularly true if she can use her daily nursing experiences to point out the needs, and thus she can coordinate her service with that of related departments such as safety and personnel."

Eyes

DR. C. D. SELBY, medical consultant, General Motors, "How Can Ophthalmologists be of Greater Service to Industry in Wartime?" in *The Sight-Saving Review*, Fall-Winter, 1943 (13:3, 160-164). Extract: "What is the industrial medical program? It consists of those medical functions which have to do with the prevention of sickness and the care of occupational diseases and injuries. The objective is to control disabilities of occupational origin and give the employees the best possible health protection consistent with the purpose of industry, the employer's legal responsibilities, and the employee's rights in the free choice of physician for care of sickness and injuries not legally related to occupation. . . . In the group of plants that I know best, certain obscure eye problems which do not appear to be covered in the procedures advocated by the Council on Industrial Health arise from time to time. For instance, some occupations, such as welding, may be thought to be harmful to the eyes. This question was put to our doctor. An ophthalmologist was asked to make an eye study of eyes of the group. He did so and his report was convincing to the workers and comforting to the management. These and similar problems do arise."

To Prevent or Eliminate Infection in *Industrial Injuries*

Azochloramid preparations have proved valuable in treating the traumatic wounds of industry as well as those encountered among our armed forces. The reduced healing time and shortened period of hospitalization effected by prompt control of infection is a welcome contribution to greater industrial efficiency. The various forms of Azochloramid provide ready adaptability to the task at hand.

For antiseptic dressings and packings that remain moist

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For lavage, wet dressings, hot soaks and compresses

SOLUTION OF SALINE MIXTURE OF AZOCHLORAMID (aqueous, prepared from powder or tablets)

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Antiseptics and Their Action, R. M. Freeman: *Industrial Medicine*, February, 1940.

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TEN YEARS AGO in "INDUSTRIAL MEDICINE"

EYE EXAMINATIONS (R. H. SEIP, in *The Sight-Saving Review*, September, 1933): This survey included the examination of the eyes of 1,265 employees in a zinc ore plant, and disclosed that approximately 17% suffered from seriously defective vision. Vision was not recorded as defective unless the defect was greater than 20/40 in one or both eyes. A large percentage of those with defective vision had never had any correction. Others had had correction, but did not have their glasses with them at the time of the examination. Others who had had correction indicated that a change in correction was needed. Employees whose visual tests indicated the advisability of further examination with a view to correction were advised to have such examination. No recommendation was made as to whom they should consult, except that they were urged to consult a competent medical specialist. Of the 118 employees advised to have complete examinations, 87 accepted this advice. Among the remaining 31 were a large number who already had glasses, but of which fact the company had no previous record. The examination revealed 63 employees with a visual acuity of 20/200 or less in one or both eyes. It was felt that such employees should have adequate protection from industrial injury that might affect the remaining vision. It was determined, therefore, to require those of this group whose duties were in any way hazardous to the eyes to wear safety goggles continuously when on duty. It may be interesting to note of the 63 cases with vision of 20/200 or less, 31 were supplied with prescriptive goggles; 25 were required to wear plain goggles, and seven were not required to wear goggles, owing to the type of work in which they were engaged.

—From INDUSTRIAL MEDICINE, May, 1934.

PREVENTIVE methods are relatively simple and are dependent upon sanitation for all workers coming in contact with white arsenic, the acids of arsenic, or arsenical compounds of any type. Shower baths at the completion of the day's work should be obligatory. Plants using arsenic compounds in manufacturing processes should be well equipped with dust collectors and ventilators, and workmen where dry products contain arsenic should be provided with respirators. All workmen should be instructed to wear cotton gloves or leather mittens; leggings or bicycle clamps at the bottoms of their trousers; or, in certain cases, light waterproof aprons. They should cover all tender portions of the skin, both exposed and unexposed (such as the armpits and scrotum) by a coating of ointment. Separate clothing for work is indicated in many instances. The skin of exposed workmen should be inspected regularly for the occurrence of abrasions, cuts or scratches on the exposed surface, and such areas properly protected. Arsenic "burns" may be treated with an alkaline wash immediately followed by bland ointment. Where "burns" escape notice and develop into sores, moist dressings of an antiseptic solution may be used; all such cases of "burns" should have immediate medical attention to avoid the absorption of arsenic. It is well to advise all workers to drink very liberal quantities of milk with their meals and to take a mild laxative at least once a week. It has been found that warm water has a tendency to promote "arsenic burns," so notices should be posted in the shower rooms that the dust should be washed from the body with cold water before turning on the warm shower. With preventive medicine and sanitary measures, the menace of arsenic poisoning may be entirely controlled, and the work of the industrial physician along these lines means the saving of much money and the prevention of much suffering and many deaths.

—From "Arsenical Poisoning in Industry," by CLAUDE WILLIAM CHAMBERLAIN, INDUSTRIAL MEDICINE, May, 1934.

INSTEAD of afternoon tea which our English friends regard as an institution," suggests E. J. POOR, Chairman of the Board of the Hygrade Sylvania Corporation, "why not a more practical kind of stimulus? In discussing this matter of four o'clock fatigue with DR. HENRY G. CARROLL, who supervises the eyesight of our office and factory personnel at the Salem (Massachusetts) Hygrade lamp plant, I learn there are three simple expedients, each quite effective by itself: First, and most important from the standpoint of that greatest cause of fatigue, eyestrain, the illumination may be doubled towards the middle of the afternoon. The greatly increased light immediately reduces eyestrain and the corresponding drain on the human system. That tired feeling may largely disappear. Second, vitiated air or poor ventilation may give rise to 'four o'clock fatigue.' The air may be refreshed by throwing open the windows for a few minutes. We follow this practice in our Salem office, morning and afternoon. Third, a bit of chocolate or candy may be indulged in, or even a block of sugar, serving as immediate fuel and energy for lagging mind and muscles."

—From INDUSTRIAL MEDICINE, May, 1934.

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SULFALLANTOIN Ointment
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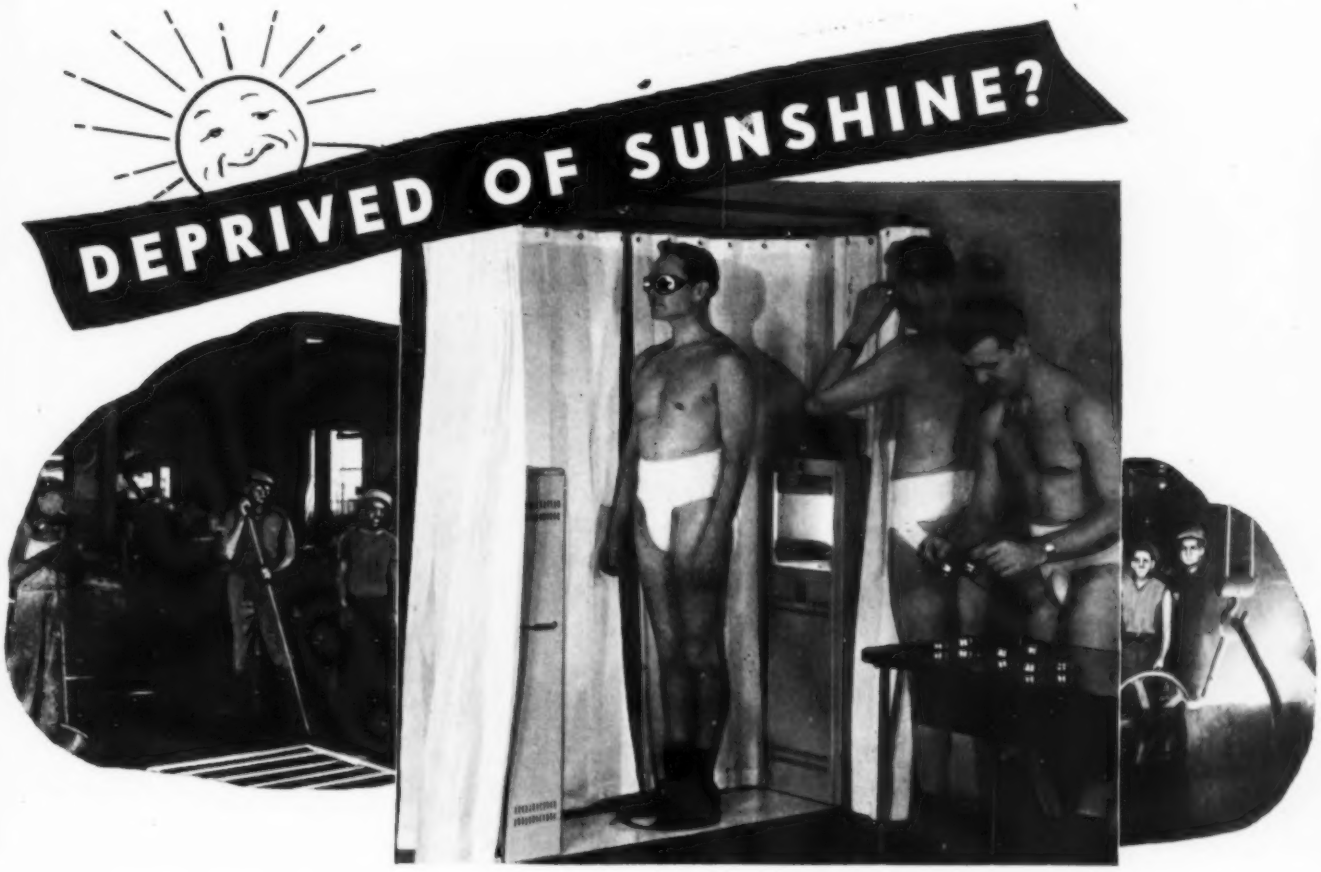

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